Perception and production of syllable structure and stress by adult Libyan Arabic speaker acquiring English in the UK

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Abstract

The field of second language (L2) phonology has recently addressed the related phonological acquisition question of to what extent exposure to native speaker L2 input following exposure to non-native accented L2 input, results in changes in the learner's interlanguage phonology (Akita 2001). If such learners do show changes over time, what kind of changes are these in both perception and production?

My study is a contribution to interlanguage studies on the acquisition of prosodic structure, and concentrates on the acquisition of English syllable structure and metrical stress by Arabic speaker. In this study the interlanguage phonology of 28 native Arabic speakers from Libya learning English in natural settings (The UK), was investigated. The average age of the participants was 32.5 years. All the subjects started learning English in school at an average age of 16.0 years. The primary source of language input was the classroom, till an average age of 25.0 years.

The method of collecting data involved three types of test. The first test covered syllable structure in onset and coda with epenthesised forms and included 185 words. The second test covered metrical stress, and included two sub-tests. Test 2A included 28 words, and test 2B included 84 sentences with grammatical and ungrammatical forms of stress. The third test contained three sub-tests. Test 3A included 9 words, test 3B included four pictures, and test 3C included 28 sentences. Tests cover perception of syllable structure and metrical stress as well as production of syllable structure and metrical stress for each learner.

In the perception test learners had to listen to a type and chose an answer from a paper in front of them whereas for production tests learners had to read words, sentences, and talk about pictures. Their production output was recorded and transcribed.

Results show differences for the perception and production sub-tasks. There is also some parameter resetting and missetting at the level of metrical stress. These results mirror the findings of Archibald (1993) Pater (1997) and Mousa (1994).

Chapter One

Introduction

Linguists can approach language from different angles. One aspect is the study of language in relation to its structure. Another aspect is the study of language in relation to its teaching techniques. The former shows different components of language in regard to its syntax, phonology, morphology etc, whereas the latter shows the learning procedures of language. These studies are theoretical and applied approaches to language respectively.

The phonology of the language includes the system of sound sequence as in syllable structure, stress and intonation. This system can be studied as segments in isolation or as combination of segments in structure as well as features and parameters. Researchers can investigate each component by itself or linked with others.

Perception and production in second language (L2) phonology is governed by first language (L1) parameters. However they differ with regard to acquiring the language in native or non-native settings. In L1 settings, learners acquire language under instruction. This kind of instruction provides learners with a non-native accent. In the case of target language (TL) settings, learners acquire the syllable and stress of their L2 in natural settings as they are exposed to the native accentuation system. The striking issue is that their perception and production is driven by L1 parameters; once they are in TL settings their perception and production will be driven by TL parameters.

My study has taken many issues into consideration. Some are related to L1 varieties as Standard Arabic (MSA) and Libyan Arabic (LA) as well as to teaching English in Libya (IL). For Arabic varieties, there are some studies that dealt with the issue (For example Watson 2002, Hetzorn 1997, Versteegh 1997, Holes 1995, Irvine

1994.). Some specific studies to LA have discussed the Libyan dialect. (Abumdas 1985, Owens 1973).

Studies of perception and production of adults acquiring L2 phonology have not dealt with perception and production of L2 in native language settings and in the target language setting. However, there are some contributions to the field (for example. Brown 2000, Flege 1993, Bohn and Flege 1990, Flege 1988, Borden, Gerber and Milsark 1983). There are some studies of the syllable and stress of Arabic varieties (Al-Ageli 1996, Mousa 1994), but there aren't many studies on the perception and production of the syllable and stress after exposure to the TL accentuation system.. Akita (2001) was the first to address the issue. For input in Libya, there are some studies of Libyan learners of English L2 phonology in L1 settings (Milton 1985, Bottaga 1991). However, those studies did not provide an explanation of MSA and LA and their influence in the phonology of L2.

In studying language, many issues have been taken in consideration. These issues are related to the first language, learner's age, cognitive competence of the learner, learnability and a number of other issues. First language plays a major role in shaping the competence of the second language learner. It is also clear that language learning is affected by the age of learners and they all shape the competence of the learner. The more recent issue among them is Universal Grammar and the principle and parametric model. UG plays a major role in acquiring the first and second languages. Principles are language universal whereas parameters are language specific. In acquisition, learners reset some parameters and mis-set others when they acquire a second language. However recent research within the principles and parameters framework provides evidence that not only are L1 phonological parameter settings transferred by learners (Archibald 1993), but as stated by Broselow and Finer 1991, Pater (1997) and Young-Scholten (1994), parameters are also reset to a new value. New research has not yet found out if adults eventually reset phonological parameters to the correct L2 values. This leads to the assumption that the inability to reset parameters to the target language value is the cause of incomplete attainment in phonology.

If we consider the role of L1 in acquiring L2 we find out that there are stages where the role of L1 is very significant. These stages are guided by similarities and differences between the two languages. In cases where similarities exist between the two languages we expect that L1 will help in acquiring the L2. In the contrary if differences appear then L1 will hinder the acquisition process.

Second language learners often have extraordinary difficulty mastering the accent and intonation patterns of their target language. L2 phonology has received little attention in the field of second language acquisition in comparison with other areas of grammar. But, as in other areas of second language acquisition, rather than systemising the learners' output itself, we have to model this based on the representational hypotheses the learner makes use of. The goal of L2 phonological theory is to specify the set of sounds in a language, the permissible sequences, and the phonological process at work in that language.

Generally speaking, there are two theories in operation: the first one is linguistic theory and the second one is language acquisition theory. The development of second language acquisition research reveals that it has been clearly influenced by linguistic theory developments. Research in language acquisition requires one to strike a delicate balance between these two theories in order to have a comprehensive theory. Our dealing with them will involve theoretical components of languages and the implication of the findings in an acquisition framework. For language learning two competing theories appear to work in the study of language. One of them deals with the psychology of learning as behaviour where habits and errors play an important role. Skinner and his followers explain the learning mechanism as the association of a particular response with a particular stimulus. The other one deals with a mentalist view of language. Chomsky stressed the active contribution of the child in the learning task and minimized the importance of imitation and reinforcement.

According to Chomsky (1965), the child is born with an innate capacity (a language acquisition device) which consists of a set of general principles that apply to all languages rather than a set of particular rules. Lennerberg (1967) stated the biological prerequisites of language and argued that the child's brain was adapted to the process of

language acquisition. He further claimed that there was an age of resonance (the critical period hypothesis) during which acquisition took place without any difficulty.

The logical problem of language acquisition emphasizes the fact that a rich system of knowledge emerges in the speech of the child despite a poverty of stimulus. Although it could be argued that is less relevant for phonology, where principles of phonological organization can be shown to exist, for example in the child's or L2 non-adult patterns or L2 learner's errors, we can conclude the same thing. This led linguists to assume that the child must have access to something that is a priori in the sense that it arises independently of experience, in order for language acquisition even to get started (Chomsky 1965). The term Universal Grammar is commonly used to refer to this initial state of acquisition. This theory, according to Chomsky, must be sufficiently rich and highly structured to provide descriptively adequate grammars. At the same time, it must be sufficiently open to allow for a variety of languages. UG consists of a highly structured and restrictive system of principles with certain open parameters, to be fixed by experience.

Young-Scholten (1995) states that the aural input learners in a foreign language classroom receive, from their teachers and their peers, is primary linguistic data and functions as positive evidence. A problem arises with positive evidence in the classroom when the input constitutes an accent which deviates from whatever standard the learners are expected to acquire. Non-native accented input is thus positive evidence with negative effect.

As the traditional view of UG stated it to be a system of grammatical modules, each of these constituting universal principles, language learning is viewed as process of setting these parameters to one or the other of their values. It is assumed that UG provides the learner with a set of parameters together with knowledge of possible settings of those parameters. Phonological systems can also be described in terms of parameters (Dresher and Kaye 1990.)

The acquisition of a second language is different from that of a first language. This is clear in adult second language learners as they don't achieve the same native competence as children. Children do not experience the same degree of difficulty that L2 learners do. This difference between L2 and L1 acquisition is most apparent with respect

to the acquisition of second language phonological system. Children achieve native competence while second language learners have difficulty mastering the pronunciation system of their L2. This failure is taken as evidence that Universal Grammar does not work in second language acquisition. However there seem to be other factors in addition to UG such as sufficient input and other learning mechanisms.

The role of the first language is a significant factor in learning a second language in that the second language learner comes with the knowledge of L1. There is, however, a long debate about the role of L1 in L2 among researchers of language acquisition.

The interlanguage phonology of the learner is shaped by the kind of input they are exposed to in the target language setting. Furthermore, there are other factors that affect the accent of L2 learners, such as the age of learners as they are exposed to target language (TL) settings. However the amount of input seems to have a strong effect in second language phonology. Moyer (2007).

The nature of L2 acquisition is not similar to L1 acquisition, when the acquisition processes were setting to the L1. Contrary to this state is the acquisition of L2 TL settings. In this case acquisition follows the same developmental processes of the L1. In phonology, for example, the acquisition of syllable structure and stress of the L2 is much easier in a TL setting. One cannot expect learners to gain final attainment in L1 settings. According to the parametric model of learning, parameters can be set, reset and mis-set in a second language. It is only fairly recently that researchers dealing with second language phonology have realised the value of the parametrical approach.

Another problem is teaching and learning the L2 in terms of its phonological features. If teaching and learning happened in the L1 setting, learners may not gain a native-like accent, and there will be no final attainment in both perception and production. These are two cognitive abilities in acquiring the language. L2 learners come to learn a language with the parameter settings of their L1. In order for parameters to be reset, learners have to first perceive before they can produce. The idea I will pursue is based on Broselow and Park (1995) that at stage one perception and production is governed by L1, and at stage two, perception is governed by L2 and production is governed by L1. In later stages both perception and production is governed by L2 parameter settings.

The more striking issue is perception and production as phonological competence. These two cognitive abilities are approached differently by many linguists. Some relate them to a cognitive ability in the mind of the learner whereas others have related them to as cognitive mechanism between two learners. If we accept the former then we will consider the mechanism at play in the mind of the learner. However a different view will be considered if we accept the latter, where we have to consider the mechanism at work between two learners interacting in production and perception.

There are many studies which indicate that perception comes before production. However one can not accept this relationship as the whole process, because in the stages of L2 acquisition, perception and production are affected differently by target language input.

Perception and production of Arabic learners of English is to be investigated for syllable and stress. This mixture of interlanguage phonology has rarely been dealt with in previous works, particularly in regard to the amount of input in L1 Arabic and L2 English settings. The perception and production of the syllable might not be at the same level of the perception and production of stress in the acquisition of the L2. In other words, learners might better-succeed in the perception and production of L2 syllables than of stress.

The focus of my study is to find out: (1) the effect of exposure to native English speaker input in the UK on L2 learners who received foreign-accented input for many years; (2) the specific changes that happen in their phonology when they are supplied with this sort of primary linguistic data (PLD); (3) the effect of language varieties on their perception and production of TL. The main aim of the study is to contribute to interlanguage phonological theory and the implications for teaching by revealing a connection between variables. The subject is however still in transition and there is a need for more research to better-understand the case of Arabic- speaking learners of English.

The aim of this research is to analyse the non-target production and perception of native speakers of Arabic and the effects and changes after exposure to positive evidence assumed to have a positive effect. (Akita 2001) To achieve this aim, I contrasted MSA,

Libyan Arabic and English syllable structure and stress. On the basis of this I have predicted the problems likely to be encountered by Arabic learners of English in phonology by looking at previous studies since 1957. A testing instrument was used to find out the effect of the L1 and the changes made in the learners' phonological systems.

The study is an attempt to test the applicability of the universality of interlanguage phonology in second language learning in the case of Libyan Arabic native speakers, replicating with such learners Akita's (2001) study using Japanese learners of English. Akita's question is: what effect will exposure to "positive evidence with positive effect" have on L2 learners who have received foreign-accented input for many years? Does their phonology undergo any changes when they are supplied with this sort of PLD, or after years of negative influence, is it too late for their linguistic competence to undergo changes? If changes are evident, what kind of changes are they?

Libyan native speakers of Arabic learning English are the representative population used as a sample for this study. A pilot study was carried out for testing the reliability and validity of the instrument and selection of participants, after which a cross-sectional study was carried out for nine months. Our sample consists of three groups: learners who have just arrived in the UK (from a week to three weeks), learners of one to two years' stay in the UK, and learners of two to five years' stay. There were twenty-three subjects and native speakers of English as a controlling sample. The main instrument for data analysis was the Windows computer package 'SPSS' and some spectrographic analysis.

In chapter two I introduce issues related to interlanguage phonology as well as issues related to perception and production in L1 and L2 acquisition. A factor that I cover here is the age of learner (the critical period). A recently discussed factor is the amount of input learners are exposed to. Then IL syllables and stress from a learning prospective sheds light on some previous works. Then I review second language teaching, approaching implications of acquisition teaching techniques.

In chapter three, Arabic and English phonology is investigated. The study of L1 acquisition provides us with what sort of competence the learner is equipped with before exposure to L2. I start by looking at Arabic varieties: Modern Standard and the Libyan dialect. The vowel and consonant system were first presented. Then the structure of

syllable in both varieties is dealt with. The sequence of clusters is the first issue in syllable structure. The /q/ and the /j/ phonemes turn out to be significant markers among various dialects of Arabic. The prosodic features were investigated at the level of stress in relation to syllable type. This showed variation between the two dialects in stress assignment.

The process of epenthesis is then dealt with as previous research phenomena. Broselow (1987) shows errors by Arabic learners of English. In the first language, learners apply epenthesis differently with regard to varieties. Speakers of certain dialects of Arabic break consonant clusters in the TL in positions different from other dialects. Egyptian speakers break clusters by inserting a vowel between clusters whereas Iraqi learners insert /i/ before the initial clusters. This strategy is followed for clusters and thus it is due to dialects' differences.

In chapter four I reviewed previous studies of Arabic learners of English. Incorrect perception and production are also reviewed. Then I outlined teaching and perceptual training and instruction. Later I reviewed teaching English pronunciation in Libya and the pronunciation of first and second language learning.

In chapter five I present the study and the discussion of the results. Methods of collecting data were introduced with the sample used in the study. The specific methods of testing perception and production of syllable and stress are introduced in this chapter. I then show tables and graphs of results based on data analysis. In my discussion I tried to include the acquisition of perception and production as well as the syllable structure of onset and coda. I investigated the sequence of CC and CCC clusters with regard to perception and production. Stress at the level of word and sentence perception and production was discussed. After that the relationship between perception and production was discussed. My conclusion remarks will be in chapter six.

Chapter Two

Second Language phonology

2.1 Introduction

In this chapter I will discuss second language phonology with regard to the issues that affect and shape learners' L2 phonology. The interlanguage phonology of learners is outlined first. Then the factor of age and input are discussed. These two issues are dealt with in reference to perception and production of syllable structure and stress. Later I will present foreign language teaching and input in non-native settings.

2.2 Interlanguage phonology

The interlanguage (IL) phonology of a learner is the system that develops in the phonology of adult learners after an exposure to L2 input. Adults acquiring a second language often make errors. These errors are representative of an underlying system, just as a child learning a first language has a system different from adult native speakers of that language. Non-native features of the IL of an adult learner are often due to negative transfer or interference from the first language, in addition to other errors that cannot be attributed to L1 transfer and are not native-like in the L2. These features might be referred to as universals of language acquisition. Thus if L2 errors cannot be attributed to L1 transfer and these errors are the same as in L1 acquisition, then it is reasonable to conclude that these errors are due to universals. That is, an IL is the product of the L1, the L2 and universals.

Errors result as negative transfer when L1 and L2 phenomena are different. However, positive transfer results when the phenomena are the same and this leads to native-like utterances. In language acquisition, learners with a variety of language backgrounds often make the same errors in the L2. It is also noted that children acquiring that same language as their first language also make these errors. In this case they are a

result of universal language acquisition, where Universal Grammar plays a major part. This UG is equated with the LAD (language acquisition device) which enables learners to acquire language. According to Young-Scholten (1995), in access to the phonological principles and parameters of UG in the L2 acquisition, the question of ultimate attainment becomes much more relevant. For L2 syntax if both principle and parameters are accessible to adult learners, they will develop native syntactic competence in the L2. Conversely, if adult L2 speakers show evidence of native competence, then this is because they have access to UG. More recent research within the principle and parameters framework provides evidence that not only are L1 phonological parameter settings transferred by learners but parameters are also reset to a new value (Young-Scholten (1994), Pater (1997), Broselow and Finer (1991). Even though learners may arrive at a parameter setting which is not that of the L2, the fact that they progress beyond the L1 setting is evidence that the learner has access to the parameter involved. Young-Scholten presumes that the inability to reset parameters to the target language value explains incomplete phonological attainment.

New research findings predict that L2 phonology is governed by a system which is not solely related to the learner's L1. This suggests that learners have access to universal grammar (UG). The learner's new system of language is affected by the L1 experience but it is not guided by it. The Language Acquisition Device (LAD) - the innate process for language learning - is the system that guides the developmental process.

Second language acquisition research is influenced by the development of linguistic theory. Language acquisition has been viewed as a creative formulation of a theory of a grammar rather than as learning a set of habits. Traditionally, language acquisition has been referred to as unique to the first language, and language learning has been referred to as unique to the second language. Acquisition is innate capacity to language development, where the child acquires his/her language naturally. Learning, on the other hand, is developing skills that happen after the learner has an exposure to a native language. Recent researches in second language learning are concerned with universal grammar and with its innate principles and parameters.

Lado (1957) developed a careful systematic comparison of the descriptive structural analyses of two languages where he included the linguistic features as well as the social and cultural features. He assumed that we could predict and describe the patterns that will cause difficulty, by comparing systematically the language and culture to be learned with the native language and culture of the student. He adds that the preparation of up-to-date pedagogical and experimental materials must be based on these kinds of comparisons.

In learning a foreign language, according to Lado, learners tend to transfer their entire native language system in the process. For example, they transfer to that language their phonemes and their variants. The transfer is usually in one direction, from the native language to the foreign language.

Lado also argues that when dealing with sound segments in a foreign language, linguists need a sound linguistic analysis the phonology of language, which includes: segments, stress, intonation, and juncture and transition. Secondly, they need to compare the sound systems of the native language and the target language, where they take up, for example, each phoneme separately and include at least similarities between the phonemes in the two languages, the variants of the phonemes in the two languages in terms of similarities, and if the phonemes and their variants are similarly described. Thirdly, they need a description of troublesome contrasts, including problems in perceiving and producing the new phonemes. At that point errors can be predicted. (12)

The application of linguistic and psychological theory to the study of language learning added a new dimension to the discussion of errors. Corder (1967) mentions that the errors were the result of interference in the learning of a second language from the habits of the first language. The major contribution of the linguist to language teaching was seen as an intensive contrastive study of the systems of the second language and the mother tongue of the learner. He claimed that out of this would come an inventory of the areas of difficulty, which the learner would encounter.

According to Corder, a learner's errors are significant in three different ways. Firstly they are significant for the teacher, in that they tell them, if they undertake a systematic analysis, how far the learner has progressed, and consequently what remains for them to learn. Secondly, they provide the researcher with evidence of how language is

learned or acquired, and what strategies or procedures the learner is employing in their discovery of the language. Thirdly, they are indispensable to the learner, because we can regard the making of errors as a device the learner uses in order to learn. Thus the making of errors is a strategy employed both by children acquiring their mother tongue and by those learning a second language.

Selinker (1972) raised the point that the existence of a separate linguistic system based on the observable output, which results from a learner's, attempted production of a target language norm (TL). This linguistic system we will call interlanguage (IL). He assumes that predictions of behavioural events in a theory of second language learning should be primarily concerned with the linguistic shapes of the utterances produced in ILs. The interlingual unit is composed of three linguistic systems: native language system, interlanguage system, and target language system.

This system becomes available to the second language learner who will not achieve native speaker competence in the TL. The psychological state of the learner is mentioned as he/she has switched his/her psychic set or state from the native-speaker domain to the new domain of interlingual identifications. Selinker postulates that these relevant units of interlingual identifications do not come from anywhere: they are latent in the brain in a latent psychological structure, available to an individual whenever he/she wishes to attempt to produce the norm of any TL. The problem raised is that how could we create the same experimental conditions for each of the three.

Eckman (1977) considers an application of the CAH to a segment of English and German phonology, and shows where the CAH as formulated at that time fails to make the correct predictions. Then he demonstrates how, with the incorporation of universal principles, the empirically correct predictions can be made. Later he shows that these same principles can be used to correctly predict the areas of difficulty in an example from syntax.

He proposes that the contrastive analysis hypothesis (CAH) where we make a comparison between languages in terms of differences that predict difficulties, as discussed above, should be revised to incorporate a notion of difficulty. According to him, this notion corresponds to typological markedness, which can be determined independently of any particular language and independently of the facts concerning

second language acquisition. He argues that if typological markedness is incorporated into the contrastive analysis hypothesis, it is possible to predict not only the areas of difficulty for a second language learner, but also the relative degree of difficulty. Moreover, he argues that typological markedness is a natural and highly plausible notion of difficulty.

Eckman assumes that the notion of 'degree of difficulty' corresponds to the notion 'typologically marked' where markedness is defined as: a phenomenon A in some language is more marked than B if the presence of A in a language implies the presence of B; but the presence of B does not imply the presence of A.

In the markedness differential hypothesis (MDH) the areas of difficulty that a language learner will have can be predicted on the basis of a systematic comparison of the grammars of the native language, the target language and the markedness relations stated in universal grammar, such that:

(a) Those areas of the target language which differ from the native language and are more marked than the native language will be difficult.

(b) The relative degree of difficulty of the areas of the target language which are more marked than the native language will correspond to the relative degree of markedness.

(c) Those areas of the target language which are different from the native language, but are not more marked than the native language, will not be difficult.

This theory is supported by some findings with respect to the position in which a voice contrast is maintained. It is found that languages can be typologized as:

Type	**Description**	**Example.**
A	Those which maintain a superficial voice contrast in Initial, medial, and final positions.	English, Arabic, Swedish.
B	Those which maintain a superficial voice contrast in initial and medial positions but fail to maintain this contrast in final position.	German, Polish, Greek, Japanese, Catalan.
C	Those which maintain a superficial voice contrast in initial position but fail to maintain this contrast in medial and final Position	Corsican, Sardinian.
D	Those which maintain no voice contrast in initial, medial, or Final position.	Korean.

Figure 2.1.Language typology.

The above typology indicates that A, B, C and D leads to a universal hierarchy which can be shown as:

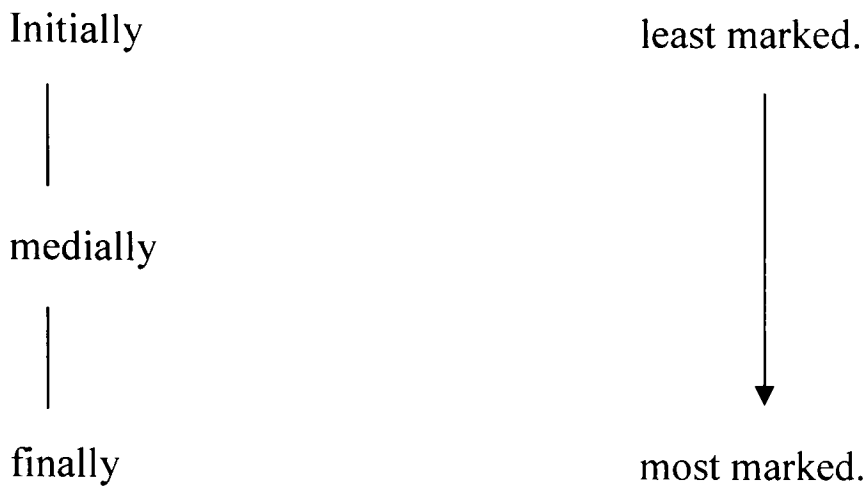

Figure 2.2 degree of markedness.

Thus Eckman concludes that the MDH, which incorporates certain markedness relations from universal grammar, is superior to the CAH in predicting the areas of difficulty a language learner will have. The MDH is a step in the direction of resolving the controversy between whether second language learning errors are due to interlingual or intralingual interference. However, the MDH also predicts what has been assumed - that the errors a language learner makes will be due, to some extent, to that person's native language. I predict that errors of my learners are not due to transfer only but as my learners are exposed to TL input, their error rate will decrease. Furthermore the processes of acquiring will be driven by developmental stages and not transfer of L1. Thus my learners will benefit from exposure to TL accentuation.

According to Archibald (1998), error patterns in L2 acquisition might be classified in terms of transfer errors and developmental errors. They could be rated to level of proficiency in second language. The following figure shows the relationship between them:

LEVEL OF PROFICIENCY	TRANSFER ERRORS	DEVELOPMENTAL ERRORS
Beginner	*High*	*Low*
Intermediate	Medium	High
Advanced	*Low*	*Low.*

Figure 2.2 error patterns in L2 acquisition.

Thus I expect our learners to have high transfer errors during the early stages and low developmental errors during the later stages. But these errors will not be the same in perception and production of phonological competence.

Broselow (1988) states the fact that there are several patterns of incorrect production and perception of a foreign language. These errors lead to a particular theory of phonological structure. All the errors involve some aspect of prosody and are argued to result from differences in constraints on prosodic structure in native language and the foreign language. However error patterns may provide evidence for particular analyses of the native language grammar, evidence that may not be available from the study of the native language alone. Production errors of L2 strings are triggered by a mismatch between the prosodic constraints operating in the native and target languages. One error is in a mismatch in the definition of possible syllable, and second is in the definition of possible word. This leads to the conclusion that there are differences in approaches related to word in isolation and syllable. One can take the issue further to morphology rather than phonological processes within the syllable. Therefore the study of L2 with reference to L1 is needed. This study yields the interlanguage of learners before they complete their final attainment in L2 phonology.

2.3 Factors effecting the accent of L2 learners

The interlanguage phonology of the learner cannot be discussed without a reference to factors affecting accent of learners. The interlanguage phonology of the learner is governed by age and input. The age of learners is a very important issue in

learning. Furthermore the amount of input has a major effect on learners' interlanguage and final attainment in L2 phonology. Teaching the language in the L1 settings is a kind of input responsible for shaping the interlanguage phonology of the learner. Perception and production of adult learners before exposure to TL could be among the factors effect the accent of learners as they exposed to native accentuation system in target language settings.

2.3.1 Age of learner

The age of the learner is a key factor. Both the learner's age of arrival in the country and the age of learning when the learner was first exposed to the language have been found to be important variables governing whether or to what degree a learner can acquire a native-like accent, and we have to consider both factors.

The critical period hypothesis claims that a person must be exposed to a language during a certain period of time in order to acquire that language like native speakers. If exposed to that language after the critical period, the learner cannot achieve native-like competence. Lenneberg (1967) proposed the critical period started from about age two until puberty; that there was a neurologically based critical period, ending around the onset of puberty, beyond which complete mastery of a language is no longer possible. Although research suggests that there is a critical period hypothesis in phonology, there is a disagreement on the age when the critical period ends. Long (1990) claimed it is age six or seven. Patkowski (1994) claimed it is later, around age 15.

Many studies show that the majority of post-puberty learners do not gain native competence in their L2 phonology. This could be attributed to age as a factor responsible for fossilisation. Many studies show that later age of arrival in the target language setting makes a difference. The study of Asher and Garcia (1969) showed that 71 Cubans who arrived in the US between the age of one and six years were judged closest to native-like. Those who arrived between the ages of seven and twelve were the next closest to native-like mastery. The poorest among them were those who arrived later than thirteen and later than nineteen.

Oyama (1976) showed that children under the age of twelve could acquire native competence in L2. Oyama tested 60 Italian immigrants. Learners were distributed in

relation to two independent variables. One variable was age at arrival in the United States from 6-20 years, the other variable was number of years in the United States from 5 to 18 years. Results showed that age of arrival was a strong indicator for degree of accent while length of study in the United States was not.

Flege (1991) in his considerable research on the effect of age and L2 proficiency also found younger learners do better. Among them are studies on consonants, vowels, and Voice Onset Time (VOT). It was found that foreign accent increased with increasing age of arrival and the late arrivals produced no vowel consistently in a native-like manner even though they had been residents for many years.

Scovel (1981) argued that language learning ability slowly declines as the person matures, and plateaus at a low level after puberty; however, the precise level of this plateau differs between individuals. Scovel attributed this to the fact that the loss of plasticity has a particular significant effect on the area of phonology. This is because the loss of flexibility of neuro-physiological programming of neuromuscular coordination mechanisms adversely affects an individual's ability to control the articulators in pronunciation.

Scovel (1988) argued that there is a critical period for the acquisition of the pronunciation of a second language, because pronunciation is the only aspect of language performance that has a neuromuscular basis. He predicted that learners, who start to learn a second language later than age 12 will never be able to attain a native-like accent.

Krashen (1973) showed that the development of brain lateralization is complete much earlier than puberty and that is around age five. Since children up to the age of twelve seem to acquire native-like competence in L2, completion of brain lateralization does not mean the establishment of an absolute barrier in acquiring a language.

Some studies suggest that multiple critical periods exist for various sub-components of language. Long (1990) stated that at the age of six the critical period ends for phonology and later ages for morphology and syntax. Tahta, Wood and Lowenthal (1981) found that if the age of arrival was after 12-13, there is invariably accent transfer. They suggested that age-related constraints begin as early as six for suprasegmental phonology, and soon after that for segmental phonology. This showed multiple critical periods within phonology.

A number of studies suggest that there is no critical period. Bohn and Flege's (1992) study of /e/ and /æ/ found that experienced adult German learners of English showed no differences when compared to native speakers. Flege, Frieda, and Nozawa (1997) studied Italian speakers learning English in Canada and provided evidence against the critical period hypothesis and they showed no differences as well.(19) Seliger (1978) and Long (1990) suggested separate critical periods for different levels of language. Long (1990) specifies that phonological acquisition may be constrained as early as the ages 5-6, earlier than for syntax and morphology.

Ioup, Boustangui, Eltigi and Moselle (1994) tested Egyptian Arabic production in a recorded stretch of spontaneous speech. Listeners judged the non-native group as native. Julie, the subject of this study, is unusual as she appears to have acquired native-like proficiency in an untutored learning context. She has never had formal instruction in Arabic and therefore can neither read nor write the language. She migrated to Cairo from Britain at the age of 21 when she married an Egyptian. Nine days after her arrival her husband was called for military service and she was left with no one to assist her in English for 45 days. She relied on context and gesture to interpret utterances and express meaning. One can say that at this stage her language acquisition situation resembled the environment for child L1 acquisition.

Her husband returned after forty-five days. They started to use English daily at home. Arabic was used outside the home for casual encounters and at weekly family gatherings. After a year Julie became an English teacher in an Egyptian school where she had the chance of speaking with monolingual Arabic colleagues. So she began to receive extensive quality input on a daily basis. At the beginning of her third year, Arabic became the home language because her fluency was sufficiently developed to permit her to converse comfortably in Arabic. The study was carried out by the time she had lived in Egypt for 26 years and was working as an ESL teacher/ trainer at University level.

As Julie was acquiring the language, she facilitated her communication during her early total immersion. She kept a copy book in which she wrote what she observed concerning the language. At first her notations were analyzed wholes with attempts at guessing meanings. She began to keep separate pages for nouns, verbs, and adjectives.

Therefore lexical meaning was the main priority, but some elements of inflectional morphology were observed. She kept the book for 3-4 months. She also realized that the most salient items in that early stage were fixed expressions and idioms. Furthermore they were used frequently to enhance communication.

When her errors hampered communication she received explicit feedback. This feedback usually took the form of corrected or expanded repetitions. If she had questions about Arabic she kept them until her husband returned from the military. Julie acquired Arabic very quickly. She could use simple sentences and fixed expressions within 45 days and was communicating well by the end of 6 months. She was able to pass as a native speaker after two and a half years. In acquiring different aspects of the grammar, she reported that phonology was no problem. Her strategy was one of imitation rather than an analytical approach to the sound system. Julie easily perceived and reproduced the difficult Arabic pharyngeals and uvulars. Though she produced the velarized consonants, she was unaware of their phonemic status until she noticed the alphabetic characters for them in her children's books seven years later. In general Julie had no noticeable foreign accent; she made few mistakes in morphology and syntax; she had good control of the lexicon and was very competent in her discourse.

Bongaerts, Van Summeren, Planken and Schils (1997) investigated a group of highly successful Dutch learners of English. Their speech samples consisted of spontaneous speech, reading a text, reading sentences, and reading a word list. Results have shown that in all tasks these Dutch learners performed as native speakers. This is more evidence against the CP.

In the first study there were three groups of subjects. The first group was a control group and consisted of 5 native speakers of British English. The second group consisted of 10 Dutch learners of English who had been designated by EFL experts as highly successful learners with an excellent command of British English. One subject was a student of English at the graduate level. These subjects were lecturers who taught English at Dutch university or teacher-training institute. The third group was composed of 12 Dutch university students of English at various levels of proficiency. The Dutch subjects had no English before the age of 12. The most interesting result was that the judges could

not distinguish the group of highly successful learners from the native speaker control group.

In the second study, there were also three groups of subjects who participated in the study. The first group consisted of 10 native speakers of British English who spoke English with a non-regional accent. The second group consisted of 11 native speakers of Dutch 9 of who had also participated on the first study. All subjects in this group can be seen as late learners of English. They were exposed to English input, predominantly of the American-English variety, via the Dutch media. None of the subjects had spent any time in an English-speaking environment before the age of 12. These subjects received two hours of instruction in British-English from native speakers of Dutch in high school. They studied English language and literature at the university. This was the first time for them to be exposed to a considerable amount of mainly British English input from both native and non-native speakers of the language. They also received intensive training in RP in the first year at the university. Further they spent a year abroad at a British university. The third group consisted of 20 native speakers of Dutch who differed widely in their command of English. They included students of the English, Dutch and History departments with professors from various departments. Results have shown that learners performed as native speakers.

We expect our learners to show improvement in their TL phonology despite their age since they are exposed to a large amount of input in TL settings. Age is not the only factor that effects the acquisition of L2 phonology. The amount of input seemed to have the most effect on learners' perception and production. This amount of input can shape the phonological competence of learners.

2.4 L2 acquisition of syllable structure and stress

The acquisition of syllable structure is a key issue to the acquisition of stress. Learners of L2 phonology have to acquire the syllabification processes of TL. In the case

of my informants, consonant clusters within the syllable are problematic. Learners prefer epenthesis or deletion. But whether their perception and production are related in acquiring L2 phonology is not yet clearly approached by researchers. The problem with acquisition of L2 phonology is that learners are coming to the task with previous knowledge of a language namely L1 phonological system. If we do not consider this system in L2 phonology then our results may be misleading.

2.4.1 L2 acquisition of syllable structure

In the acquisition of syllable structure, Oller (1974) examined the overall strategies for syllable simplification and claimed that epenthesis in syllable-final position typifies SLA, and that consonant deletion is a feature of child L1 acquisition. Tarone (1987) examined the syllable structure errors in English of Cantonese, Portuguese, and Korean adults and claimed that the Cantonese and Korean speakers used deletion, whereas Portuguese L2 learners used vowel epenthesis. However a close look at the processes of deletion and epenthesis is required.[1]

Ingram (1974) indicates that there are at least three areas of cluster reduction known in English. These are fricative [s] reduction as in spot> [pot], liquid [r l] reduction as in train>[tein] nasal [m n ng] reduction as in bump> [bop]. Clusters of three elements are reduced to one consonant as in strong > [song].

For clusters within a syllable, Broselow and Finer (1991) studied native speakers of Korean and Japanese in relation to L2 acquisition of onset clusters in syllables and found effects of both markedness (defined in terms of the subset relation among parameter settings), and transfer (defined in terms of the native language parameter settings). However they stated that L2 learners resort to a parameter setting that is intermediate in markedness between the L1 and L2 languages, rather than initially assuming the unmarked setting for a given parameter on transferring the L1 setting.

The syllable simplification strategy applied was that of vowel epenthesis and not consonant deletion. The preference for vowel epenthesis was suggested by Weinberger

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[1] The acquisition of syllable structure in a second language seems to be influenced both by universal principles of prosodic structure and by properties of the L1 syllable structure, as discussed in Young-Scholten and Archibald (2000).

(1987) to be due to the fact that this strategy results in recoverable or transparent derivations, where the target form can be easily recoverable from the interlanguage form. On the other hand, consonant deletion widens the gap between the interlanguage and target form.

Consonant deletion is another strategy employed by learners in both L1 and L2 to simplify the pronunciation of sequences of consonants. In child language, two types of reduction are known: weak syllable deletion, and consonant reduction. In the first type, unstressed syllables are deleted in the child's utterances (Ingram 1974; Smith 1973). It is also a common observation that children at the onset of speech simplify consonant clusters to a single sound.

Two proposals have been proposed to account for cluster reduction in L2 phonological acquisition. They relate to a certain universal principle. Eckman (1987) proposed that the rules needed to explain L2 phonological data are governed by the principle of typological markedness. Eckman suggests that the cluster reduction rule is constrained as to the type of resulting clusters. That is, the types of clusters it can produce as output. He makes use of three universal generalizations put forward by Greenberg (1978):

i. In languages with final consonant clusters, the presence of a sequence of a consonant of length m in final position implies the presence of at least one sequence of length m-l in this same position.

ii. In languages with final consonant clusters, the presence of a final cluster consisting of stop-stop implies the presence of final clusters consisting of fricative-stop.

iii. In a language with final consonant clusters, the presence of a final cluster consisting of a fricative-fricative implies the presence of a cluster consisting of either a final fricative-stop or a final stop-fricative.

Thus, Eckman concludes that some of the cluster types in the above remarks are relatively more marked than others. It seemed that tri-literal clusters in final position are more marked than bi-literal clusters, since the presence of the former implies the presence of the latter, where the opposite does not apply. He further raised the point that cluster

reduction works on final tri-literal clusters to produce bi-literal clusters consisting of F-S or S-F and not clusters containing S-S or F-F. One can postulate that cluster reduction is a way of transferring consonant clusters into simpler, less marked ones.

The second theory is related to sonority. Tropf (1987) argues that consonant reduction occurs in accordance with the universal principle of the Sonority Hierarchy. This could be exemplified in the pronunciation of German words containing consonant clusters, initially and word finally. Spanish learners delete the plosive. Tropf shows that it is the intrinsic sonority of the consonant and not its position in the specific syllable structure which is decisive for the ease of acquisition (see 1 below).

Tropf points out another correlation regarding the acquisition of [tsv] clusters in initial position. In Spanish, not even parts of this cluster are accepted in the syllable onset. Thus the realisation of the plosive implies the realisation of the two fricatives in the same cluster, and the realisation of the sibilant, in turn, implies the realisation of the fricative [v]. He also argued that the ease of acquisition of the first element of a final cluster in a consonant-plosive or consonant-fricative cluster corresponds to the degree of sonority. The striking point is that some of the above generalisations apply to learners in production only. In other words, perception and production cannot be applied to the same results. The examples below are from the study of Spanish speakers of German.

(1)

[pfunt]	'pound'
[tsi:ən]	'pull'
[kopf]	'head'
[klaps]	'slap'

Syllables consist of an onset, nucleus, and coda. The onset and coda are occupied by consonants forming the margins of the syllable, and the nucleus is universally obligatory and occupied by vowels. Thus, the universal structure for syllables is:

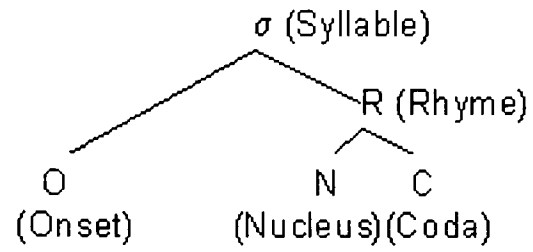

Diagram 2.1

In their studies, Broselow and Finer (1991) showed that the results of the phonology experiment support the hypothesis that learners seem to converge on a parameter setting somewhere between the native and target language settings. The Japanese and Korean learners appear to have moved to a position midway in markedness between the L1 and L2 grammars. The assumption is that learners of a second language start out with the parameter settings of the native language and then move in stages through the intermediate settings in the direction of the target language settings. Broselow and Finer adopt the sonority hierarchy as shown below:

(2)

Obstruents-Nasals-Liquids- Glides-Vowels

Least Sonorous.....Most Sonorous.

Further they assign a sonority value to each class which allows them to determine a sonority distance of allowable clusters. They adopt the following sonority scale.

(3)

Class	Value
Stops	1
Fricatives	2
Nasals	3
Liquids	4
Glides	5

In the acquisition of syllable structure and stress I predict learners in my study of Arabic speakers of English who have lived in the UK the longest to have acquired a target-like structure. At lower levels, they will exhibit consonant deletion or epenthesis in their attempts to produce TL clusters. Furthermore, they will benefit from the input in TL settings in improving their accent. Stress in the TL is shaped by syllable structure, and the epenthesis and deletion lower level learners, use will affect stress and its parameters. This leads to the conclusion that the syllable plays a major role in stress.

As we will see, the structure of the syllable in the L1 is different from the L2. The higher level learners will thus acquire a new syllable structure rather than continue to transfer their L1 structure. Thus we can show that there are developmental processes in acquiring syllable structure of TL. In my study I will cover the syllable structure of English shedding light on clusters as they have a major effect on syllabification. Once they are in the target language setting they will undergo some changes in their phonology. These changes can not be found without a reference to previous knowledge of learners.

2.4.2 L2 acquisition of stress

In phonology, word stress refers to the fact that in a polysyllabic word, there is always one syllable which is more prominent than the others. The syllable rimes are organized into constituent structures. First the rimes are grouped into feet (labelled F), and then the feet are organized into constituents that make up the phonological word. Languages of the world vary as to whether the feet are strong on the left or the right; whether the feet are always binary; whether the feet are built from the left edge of the word or the right; whether the word tree is strong on the left or the right; and a small number of other parameters.

Further more metrical parameters are groups of settings that characterize a part of the phonological system that captures the hierarchical nature of stress. A number of universal parameters were outlined by Dresher and Kaye (1990) for constructing metrical structures that take the form of labelled trees where various possibilities are expressed in terms of a series of binary parameters, as shown in Table 2.1 and 2.2 below in the discussion of Archibald's and Pater's studies.

The mechanism at work is that learners seem to transfer parameters of L1 in producing an L2 system. That is especially when the two languages differ. They can access the principles of Universal Grammar (UG) and are able to reset parameters in L2. However interference from the L1 does exist. The debate among researchers of second language on the role of UG in the adult's formation of the L2 grammar is still in operation. It has been argued that whereas child L1 development is guided by the principle of UG, adult acquisition follows from principles independent of UG. Or it might be also that L2 learners have two different strategies. One is guided by transfer of rules from L1, and the other is guided by development stages as in L1 acquiring.

However there are different process in L1 and L2. The process of L1 acquisition requires parameter setting whereas the process of L2 requires parameter resetting. Parameter mis-setting could develop as learners use a system that is different from L1 and L2, which we might call the interlanguage setting.

In parameters, Archibald (1993) conducted a study on L2 acquisition of stress in English by Polish and Hungarian L1 adults. He found evidence of L1 parameter setting transfer into English metrical parameters that resulted in errors being produced, but not all the errors that were made could be attributed to L1 transfer. He further found that although adult learners are not able to reset the L2 parameters, they can access both principles and parameters of UG.

Archibald (1992) argued that the framework of parameterized universal grammar is useful in accounting for second language learner knowledge and behaviour. The vast majority of their errors can be accounted for by the transfer of their first language (L1) parameter setting into the second language (L2). The study is designed to investigate the acquisition of English stress patterns by adult, non-native speakers of English, and examine one aspect of the adult grammar of English, metrical phonology, and how people learning English as a second language come to attain this system of knowledge.

He claimed that it has only been fairly recently in the field of second language acquisition that interlanguage phonology has begun to be investigated in depth within sophisticated phonological theories. Furthermore, he assumed that the phonological phenomenon of stress seems to be particularly well suited to his studies.

He studied 23 adult Polish speakers studying English in London, who ranged in age from 23 to 64. The study consisted of two tasks. The first task was a production task, which had two sub-tasks. In the first sub-task the subject was asked to read a list of words out loud into a tape recorder, and in the second sub-task the subject was asked to read a list of sentences. The sentences contained each of the targeted words. The second task was a perception one, in which the subject listened to a native speaker pronounce each of the words twice from a tape. The perception task was conducted second so that the production task was not affected.

In both production and perception of all those classes of metrical stress, the most common error was to stress the penult. This is the usual case in Polish stress and is evidence of transfer of the L1 parameter settings. He concludes that the learners are transferring their L1 parameter setting into L2. The principles and parameters model is useful in describing interlanguages as well as monolingual, adult knowledge. His studies have shown that stress is not a single thing to be acquired, and that a careful investigation of this phenomenon can help to explain why the learners behave in the way that they do.

He assumed that his study has ramifications in the fields of theoretical linguistics as it has provided some empirical support for a theoretical model; and also in second language acquisition, as it has shown the utility of adopting the learnability approach to research in this field as we try to account for the acquisition of second language competence.

Archibald (1993) conducted an extensive study on L2 acquisition of stress in English by Polish and Hungarian L1 adults. He found out that there is evidence of L1 parameter setting and transfer into English metrical parameters that resulted in errors being produced. He further found that although adult learners are not able to reset the L2 parameters, they can access both principles and parameters of UG. So learners transfer L1 parameters in dealing with L2s.

Further study was carried out by Pater (1997) as he studied French learners of English in order to investigate whether learners reset any of the many metrical parameters which have different values in the two languages. His results support Archibald (1993) that learners can reset metrical parameters, but there is also considerable evidence for the use of parameter settings that are incorrect for English, as well as French. This leads to

the conclusion that not only do second language learners reset metrical parameters, but they may also sometimes mis-set them as shown by the *. See table (2.1) below.

Table 2.1 Interlanguage parameter settings. (Pater 1997).

Parameter	English Setting	French Setting	IL Setting
P1:Extrametricality	On	Off	Off*
P1 A:Edge	Right	N/A	N/A
P2:Foot Size	Binary	Unbounded	Binary
P3:Foot Headedness	Left	Right	Left
P4:Quantity-Sensitivity	On	Off	On*
P4.A:Coda Weight	On	N/A	On*
P5:Foot Construction	R >L	N/A	L>R
P6:Word Headedness	Right	Right	Left*

Archibald (1995) studied learners of Spanish, Polish, Hungarian, and English and provided the following details about the four languages.

Table 2.2 Parameter settings in four languages

Parameter	Spanish	Polish	Hungarian	English
P1(word tree)	right	right	left	right
P2(foot type)	binary	binary	binary	binary
P3(built form)	left	left	left	left
P4(strong on)	right	right	left	right
P5(QI/QS)	QS	QI	QS	QS
P6(sensitive to)	rime	NA	nucleus	rime
P8A(extrametrical)	yes	no	no	yes
P8(extrametrical on)	right	NA	NA	right

Adapted from Archibald (1995)

As can be seen from the above table, the stress parameters in Spanish and English are virtually identical. Polish stress is fixed for the most part and differs from English in treating extrametricality and quantity sensitivity. On the other hand, Hungarian has fixed stress. Main stress in Hungarian falls on the initial syllable of a word. Therefore the word tree is strong on the left. It also seemed that Hungarian, like English, is quantity sensitive; but it is sensitive to the nucleus.

Of different levels of phonology results have shown that prosodic features do not develop in comparison to other components such as segments and syllable. This is in line with Akita's findings, as she has found that learners performed differently depending on their initial proficiency level upon their arrival in the UK. Of the three learners, the one with the lowest proficiency demonstrated the most improvement in areas where other learners also exhibited improvement. Therefore it seemed that it was possible to reach a certain level of proficiency if learners were supplied with native speaker-accented input. She further claimed that learners performed differently depending on the sub-component of phonology. No improvement was observed for metrical stress for any of the three learners while some improvement was observed for two of the learners at segmental and syllable level. The results were consistent with Leather and James's (1991) study claiming that transfer is prominent only during the early stages of acquisition at the segmental level, while transfer persists well into advanced stages of acquisition with respect to prosodic structure.

2.5 Perception and production

The long debate about the relationship between perception and production has not yet revealed the mechanism at work. However, most researchers agree that perception precedes production. The fact is that perception and production of L1 differs from L2. In the acquisition of a first language, learners' perception and production will develop without previous input. This means that learners are creating their cognitive phonology. However in the acquisition of second language, learners are coming to the task with knowledge of first language. This mechanism should be taken in consideration in dealing with perception and production. Thus studies have to deal with perception and production as related to each other in regard to L1 and L2.

Most research done on L2 in this topic has dealt with segments only, rather than syllables or prosodic features. Although methods of studying both abilities might differ, findings should be linked to provide a comprehensive theory. In addition to the amount of input, age of learners, previous knowledge of L2 and stages of learning affect these two abilities.

Some studies suggest that perception and production are related; Bohn & Flege (1990) concluded that in the early stages of L2 speech learning, perception might lead to production. Borden, Gerber & Milsark (1983) found that self-perception develops earlier and may be a prerequisite for accurate production. Flege (1993) studied vowel duration as a cue to voicing in English words ending with /t/ or /d/ by Chinese. Results were in agreement with perception before production. Akita (2001) indicated that perception and production are related and it is not the case that they are two separate processes, which are acquired completely independently.

Other studies suggest that perception and production are not related, Sheldon & Strange (1982) conclude that perceptual mastery of a foreign contrast does not necessarily precede adult learners' ability to produce acceptable tokens of the contrasting phonemes. The Flege & Eefting (1987) study of Dutch learners of English suggest that the distinction between the two languages in perception was not as clear as in production. This led them to conclude that there is a disparity between production and perception.

The above studies that addressed the issue have tried to show the complexity of the topic but we can still conclude that:

i. There is a link between perception and production as cognitive abilities and it is hard to separate them.

ii. There are many factors in operation that seem to play a major role in the interaction between production and perception.

iii. According to stages of learning, perception and production are controlled by L1 and L2 mechanisms. These can be as follows: firstly, perception and production is set at L1 parameter settings in case of beginners; secondly perception is governed by L2 whereas production is governed by L1 in the case of intermediate and advanced; thirdly, both perception and production is set at the L2 parameter setting in the case of final attainment.

iv. The relationship between perception and production might differ according to the components, segments (vowels, consonants), syllables, and prosody. This could be attributed to linear and non-linear analyses.

In perception and production, Liberman and Whalen (2000) claim that there are two widely divergent theories about the relation of speech to language and they relate the two theories to perception and production features. The point of these is the more conventional, horizontal theory: the elements of speech are sounds that rely for their production and perception on two wholly separate processes, neither of which is distinct linguistically. Those processes begin with ordinary (non-linguistic) motor and auditory representations that are then connected by purely cognitive means to language proper. They refer to language proper as a separate domain where the outcomes of primary processes are sent, and find the mental machinery capable of the heavy lifting required by phonology, morphology and syntax.

The second theory is the less conventional, vertical theory, that the speech elements are articulatory gestures that are the primary objects of both production and perception. Those gestures form a natural class that serves a linguistic function and no other. Thus the primary representations are immediately phonetic gestures of the articulatory apparatus, having been produced in a specialized phonetic mode that serves as the basis of the larger specialization for language. They refer to speech as a constituent of a vertically organized system, specialized from top to bottom for linguistic communication.

According to Liberman and Whalen, the vertical theory provides the more plausible answers to important questions of a biological kind. They have concluded that it is possible to see how, by creating distinctly phonetic motor structures to serve as the ultimate constituents of language, the phonetic specialization enables speech to meet the requirements for parity, as well as those for particulate communication, while also giving it a biological advantage over the reading and writing of its alphabetic transcription. This refers to the idea of how to convert fluency in speech to fluency in the use of its alphabetic transcription. They refer to a phonetic motor which constitutes language both for phonetic specialization and for particular communication.

Furthermore, they suggested that we have yet to discover exactly how the phonetic motor structures find expression as coordinated movements of the articulators; how, despite elaborate overlapping and interleaving, they are organized into precisely bounded segments; and how the inverse transform from sound to motor structure is accomplished. They have also claimed for the vertical theory to head the theoretical enterprise in the right direction for the fulfilment of those gaps in our knowledge.

I think they did not cover production and perception as skills and as cognitive ability by showing the relationship between them. A second problem could appear, as they haven't clearly covered both theories in their broad explanations. A third one is that they are trying to isolate speech from language despite the fact that speech is a language medium, which without language is meaningless. The evidence is that those who cannot speak, and though communicate have an exposure to language spoken in front of them. Recognition via seeing, listening and feeling leads to output representation, and that is speech gestures and the like. They have to separate between skills and cognitive ability.

Speech is, however, governed activity. It is guided by both perception and production respectively. The exchange cues that govern conversational mechanisms are the force or the nucleus for such behaviour. I predict that a close link between perception and production exists at the level of learner's competence as well as at the level of learner's communicative ability with methods of testing.

We can further conclude that perception and production mechanisms could be attributed to the level of the learner as well as to language components. Thus phonological theory and acquisition theory are both linked to each other.

This idea is attributed to Broselow and Park (1995) in studying Korean speakers of English.[2] It is also confirmed by Youssef and Mazurkewich (1998), who argue that Cairene Arabic speakers bring their native language syllabification principles to bear on the task of reading English words aloud in production. However perception and production should be related to each other for testing the phonological competence of the

[2] Broselow and Park (1995) found a Split Parameter Setting , where they showed three stages where in stage 1: native language setting governs perception and production, in stage 2:tagert language setting governs perception and native language setting governs production, in stage 3 target language setting governs production and perception.

learner. If we consider them in separation we will not demonstrate the linguistic competence of learners.

2.5.1 Perception in L1 acquisition

Studies of head turning have shown that human beings begin life with language universals to discriminate the possible segmental phonetic contrast used in the world languages. Jusczyk (1985) states that infants are born with the ability of discriminating minimal pairs, they include both native and non-native phonetic contrasts.

Aslin, Pisoni, Hennessy, and Perey (1981) have found out that English-learning infants were able to perceive pre-voiced vs. voiced distinction even though it is not used in their native language. They were also found to be able to discriminate non-native differences in articulation as found in Hindi retroflex/dental contrasts /t/ vs. /Þ/. Levitt, Jusczyk, Murray, and Carden (1988) also showed that, under certain testing conditions even some contrasts that are said to be difficult for young infants as /f/ vs. /ϴ/ and /s/ vs. /tʃ/ have been shown to be discriminable.

These results have demonstrated that human beings have the sensory and perceptual pre-requisites to eventually acquire any spoken language before the second half-year of life. This is the age when language transforms our language general abilities to language specific ones. Studies by Werker (1989) showed that by 10-12 months of age, infants demonstrate a failure to discriminate foreign contrasts because of the absence of exposure to contrasts that are not distinctive in their native language. The loss of sensitivity may be neural, attentional, or mixed.

Kuhl (1993) suggested that 'prototypes' play an important role in speech perception. The Native Language Magnet theory (NLM) shows how experience with a specific language alters the initial states. As early as six months of age, infants develop stored representation of speech information based on the ambient language, and these representations of native-language sounds constitute the beginning of language-specific perception. According to this theory, infants are born equipped with the ability to portion the sound stream into gross categories separated by natural boundaries. This permits infants to separate phonetic units into rough categories that conform to the language input

they get. The boundaries reflect the infant's phonetic category prototypes and function like perceptual magnets for other stimuli, attracting nearby members of the category.

Kuhl, Williams, Lacerda, Stevens, and Lindblom (1992) found that American and Swedish infants show magnet effects for their native-language prototypes as early as 6 months of age. According to NLM theory, infants in the latter half of their first-year are incapable of discriminating non-native sounds due to the magnet effect. Its implication for second language acquisition in general is that once the language-specific magnet is in place and the phonetic boundaries are fixed, foreign sounds tend to be pulled to a single magnet, making them no longer discriminable. Thus foreign sounds which are similar to those in the native language are particularly vulnerable to the magnet effect, while sounds that are not similar to the native language category are relatively easy to distinguish from the native language sound.

Best, McRoberts and Sithole, (1988) proposed a 'Phonological Assimilation Model' and later Best (1994) developed a 'Perceptual Assimilation Model' (PAM). They assumed that the influence of the native phonological system on infants and adult listener entails the perceptual assimilation of non-native phones to that native ones with which those non-native phonemes share the greatest similarity in phonetic features. They examined English-speaking adults' and infants' aged 6-8, 8-10, 10-12, and 12-14 months discrimination of the Zulu apical vs. lateral click contrasts plus /a/ vowel. This non-native contrast was expected to be non-assimilable to any English phonemes because the suction-release gesture used in them is not employed in English. They also had a control contrast English [ba] - [da]. They also had adult listeners take the test as well. Results of this study supported the prediction that discrimination would remain high across all ages. They then ran a new test including Zulu clicks and Salish ejectives (a contrast which may be assimilated to a single native phone) and an English control contrast. They again used a visual fixation procedure with new groups of 6 to 8 vs. 10 to12 months old. Results showed that both age groups discriminated the Zulu contrast and the English control, whereas only the younger infants discriminated the Salish ejectives. This confirms that the developmental difference between the two non-native contrasts could be attributed to differences in perceptual reorganization for those types of contrast.

Nosofsky (1988) proposed that selective attention to specific stimulus dimensions can modify the underlying psychological space and change the perceived similarity relations. He claimed that attributes on the attended dimensions become more dissimilar to each other and unattended dimensions become more similar to each other. This selective attention strategy serves to maximise within-category similarity among exemplars sharing the same dimension and minimise between category similarities. Selective attention for speech perception serves to obtain the maximum effect on favouring important distinctive contrasts in a particular language and the attenuation of cues for non-contrastive distinctions.

This was clear in the works of Terbeek (1977) as it is shown that prior language experience affects vowel perception by modifying the perceived psychological distances between the vowels. Terbeek used a scaling technique to measure the magnitude of differences between pairs of vowels where he had native speakers of five different languages listen to the vowels. It was found that perceptual distances between a pair of vowels was judged to be much longer if members of the pair contrasted phonologically in the subject's native language than pairs which were not phonologically distinctive in the language.

This indicates that the apparent loss of non-native discrimination is not a sensor-based loss but a change in selective attention. In other words, a systematised restructuring of the psychological space occurs with language experience, favouring distinctive contrasts in one's native language and the attenuation of cues for non-native contrasts.

Flege (1992) (1995) proposed a 'Speech Learning Model' which attempts to explain how speech perception affects phonological acquisition by a learner perceptually identifying 'new' and 'similar' sounds. Flege argues that 'new' sounds are not identified with L1 sounds. On the other hand, 'similar' sounds are perceived to be the same as certain L1 sounds and such 'equivalence classification' prevents the establishment of new phonetic categories. Flege, Munro, and Fox (1992) further claimed that L1 influences the perception of a second language in that it filters out acoustic differences that are not phonemically relevant in the L1, and thus learners mis-perceive the target sound.

The above findings agree with the observation that a speaker of a language which has a small vowel inventory, such as Spanish, needs to use fewer dimensions to identify

vowels than speakers whose native language has more contrasts to maintain in the language. Gottfried & Beddor (1988) showed that when American subjects were asked to identify the member of synthetic French /o/ - /o:/ continuum, they had a tendency to rely more on duration cues than native speakers of French. This was attributed to the fact of English speakers' greater use of duration cues in their native language.

Hancin-Bhatt (1994a, b) developed the 'Feature Competition Model' (FCM). This model assumes that L2 sounds are assimilated to L1 categories. Based on this model, Brown & Matthews (1997) carried out studies on L1 and L2 acquisition. Brown (2000) tried to employ the nature of the mechanism that maps the L2 input onto L1 phonological categories. Phonologically speaking, languages differ with respect to their phoneme inventories and the set of phonological features they manipulate. Thus phonemes consist of distinctive features which are organised into a hierarchy of constituents, and each phone has a structural representation that distinguishes it from other segments in the inventory.

According to FCM theory, the child needs to determine which of the phonological features are used to contrast phonemes in the ambient language and construct the appropriate representations. Thus acquisition occurs as the child detects that two segments in the input are used. The phonological feature that differentiates the two segments gets added to the child's grammar. Brown and Matthews (1997) showed that children will distinguish segments that require less structure to differentiate before recognizing those segments that require highly articulated structure. So they build up necessary features as they acquire the ambient language rather than starting off from a fully elaborated Feature Geometry (those provided by Universal Grammar), and truncating features, which is not supported by phonological contrasts in the input. Brown (2000) investigated the implications of this theory on L2 acquisition, in carrying out three experiments. Brown used two testing techniques, which investigated how the phonologies of Japanese, Korean and Chinese speakers affect their acquisition of English contrasts.

Brown and Matthews claimed that at the earliest stages of acquisition, the phonemes of the L1 have a strong influence on the perception of non-native contrasts. L2 sounds will be mapped onto the L1 categories where learners either ignore the differences they sense or do not realise the differences between them. As exposure increases, there

are two paths L2 learners may take with respect to phonemes which do not contrast in their native language. If there is a relevant distinctive feature in the learner's grammar, which is needed to distinguish a contrast, learners will come to perceive the difference and be able to acquire those contrasts and a new phonological category will be established. Thus portions of the L2 input will not map adequately onto the L1 system. This result leads to the conclusion that the slight mismatch between the L2 input and the L1 structures will cause perceptual reorganisation. On the other hand, if the feature that distinguishes a given non-native contrast is absent from the L1 grammar, then the L2 input will map perfectly onto an existing L1 category because the learner cannot perceive the difference, and there will be no trigger for acquisition.

One can conclude from the above results that learners are able to perceive and acquire those contrasts which are distinguished by features that their L1 employs for independent reasons but are unable to perceive the contrast that is distinguished by feature not utilised in the L1.

Perception process involved in the native language might be similar to those in the L2 but if they are not, the problem is that learners come to the task with L1 structure. These structures of the L1 will have a major effect in the perception and production of the L2.

2.5.2 Rhythmic perception

Studies in early L1 phonological development have largely concentrated on the examination of phonological processes and strategies that children use to reproduce adult target structures, the shape of early words, and the development of segmental inventories.

Ingram (1976) has studied in detail phonological processes that children use to reduce the complexity of adult targets and he has identified syllable structure processes [final consonant deletion, unstressed syllable deletion, clusters reduction], reduplication [either of syllable or of segmental material] and substitution processes [stopping, fronting, devoicing]. For syllable structure, it is well documented in the literature that the first syllable type that children produce is the CV structure (Jakobson 1968), then children usually move on to produce reduplicated babbling of the type CVCV or develop more complex syllable structures, such as CVC.

Speech recognition in L1 acquisition has been an area that has merited a fair amount of attention in the last decade. This interest has been shown not only by phonologists, but also by syntacticians, as the latter have had to solve the problem of how it is that infants are able to identify words or syntactic structures from what must sound like continuous and unintelligible speech. Identification of lexical and syntactic categories must be the first step children have to perform before they start looking for syntactic patterns. Linguists have hypothesised therefore that children must make use of some aspect of phonology, since the acoustic signal is all the child has access to, to identify these categories. According to this view, it is prosodic phonology that helps the child identify the linguistically relevant units that will be used to create syntactic structures. This has become known as 'prosodic bootstrapping' (Gleitman and Wanner 1982).

Some experimental research has been produced trying to identify what prosodic constituents infants are sensitive to. Hirsh-Pasek, Kemler Nelson, Jusczyk, Wright Cassidy, Druss and Kennedy (1987) found that infants between 6 and 10 months old are sensitive to clausal units in speech. Their experiment involved the insertion of artificial pauses at clause boundaries and within-clause locations in child-directed speech. Children preferred to listen to passages in which the pause coincided with clausal boundaries than to those passages where it did not. However, it looks as if subclausal units are more difficult to identify, and so nine-month olds but not six-month olds are sensitive to phrase (Jusczyck, Hirsh-Pasek, Kemler, Nelson, Kennedy, Woodward and Piwoz, 1992). Gerken, Jusczyck and Mandel (1994) confirm these findings and add that when the boundaries of syntactic and prosodic phrases do not coincide, children seem to be sensitive to prosodic, not syntactic phrases. Taken together, this implies that children use a top-down approach in speech recognition, as they seem to be working from larger to smaller constituents.

Further research has been carried out in order to investigate the type of prosodic cues that infants use for word recognition. By the end of the first year, children must have made use of some sort of accurate word recognition strategy to allow them to identify words and meaning, as it is around this time that the first word emerges in the speech of children cross-linguistically. Allophonic cues, phonotactics and stress alternations are

considered in Myers, Jusczyck, Kemler, Nelson, Charles-Luce, Woodward and Hirsh-Pasek (1996) as possible candidates for signalling word boundaries but they conclude that none of them can be used reliably as single cues to the exclusion of the rest. Admitting that children identify phrases later than clauses, it seems logical to assume that words are identified even later, and that some type of top-down process, working from larger to smaller units, is at work. This is partly the finding of the experimental evidence. Eleven-month-old English-learning infants showed a preference for listening to readings where pauses coincided with word boundaries over readings where pauses were inserted between syllables within the word. Four-and-a-half-month olds and nine-month olds, however, did not show sensitivity to word boundaries.

It seems that children are relying on prosodic information to segment words. The same experiment was run again with eleven-month olds exposing them to low-pass filtered versions of the stimuli presented in the earlier experiment. Low pass filtering has the effect of leaving prosodic information and removing phonotactic, allophonic and phonetic cues. There was no significant difference between the two. This cleared the point that prosodic information was being used to segment words.

Cutler and Norris (1988) have observed, in adult perceptual literature, that English speakers use stressed syllables to locate word boundaries in speech. The same experiment was run again to test whether these children were relying on the same cues. WS and SW words were inserted before and after the words and between the words. If they followed a metrical segmentation strategy, they would notice the interruptions of SW more readily than interruptions to WS, as the boundary would leave a weak syllable right after the pause. However, children consistently listened longer to interrupted words than to uninterrupted words, regardless of the rhythmic pattern. Myers, Jusczyck, Kemler Nelson, Charles-Luce, Woodward, and Hirsh-Pasek (1996) conclude therefore that by 11 months, children are able to identify words in speech and that their perceptual abilities operate top-down, detecting larger units first and smaller units later.

The ability to discriminate syllables might be present at birth. Bertoncini, Floccia, Nazzi and Mehler (1995) have shown that neonates are already sensitive to the rhythmic unit of their ambient language. Three-day-old French infants were tested with bisyllabic and trisyllabic Japanese words and later on with bisyllabic Japanese biomoraic and

trimoraic words. Results indicate that as early as those newborns discriminate bisyllabic from trisyllabic words, but they do not distinguish between bisyllabic words which differ with respect to the number of moras they contain. These results indicate that children or at least French children are sensitive to syllables almost from birth, while they fail to use the mora as a speech processing unit.

Myers et al. (1996) mention that previous research has shown that infants can be sensitive to monosyllabic and also to bisyllabic SW words earlier, at seven-and-a-half months. How can the view that speech perception is a top-down phenomenon be reconciled with the idea that syllables (smaller units than words) are recognised much earlier and also with this other research? They argue that initially, children may make a first pass at segmenting words by using a trochaic pattern. This will not be enough to locate word boundaries, as many English words do not have initial stress, and so that is where non-prosodic (phonotactic, allophonic) information comes in to help correct segmentation. It seems that word segmentation is a much more complex task, and children seem to be using not only multiple sources of cues, both prosodic and non-prosodic, to aid them in the task, but also different strategies, both bottom-up and top-down.

The idea that prosodic information, and in particular a trochaic bias, might play an important role in speech segmentation, is not really new. In adult perception, Cutler and Norris (1988) have shown that English speakers may employ a Metrical Segmentation Strategy for speech segmentation and in L1 production; Allen and Hawkins (1980) have proposed a trochaic bias for early words, or at least in the case of English learning infants. In L1 perception, Jusczyck, Cutler and Redanz (1993) found that nine-month-old English infants preferred listening to trochaic rather than iambic words, while this bias was not present at six months. This preference at nine months but not at six months has also been corroborated by Morgan (1996) with novel word trochaics, and by Echols, Crowhurst and Childers (1997), also using novel words.

Turk, Jusczyck and Gerken (1995) further investigated the matter and tested whether this preference to the SW pattern had to do with a preference for heavy syllables rather than for the stress alternation by testing SW patterns with a heavy and a light syllable with nonsense words initially. Their results show that English learning infants

have a preference for SW over WS both for nonsense words and real words, and that the preference for SW was evident when the strong syllable was light too. This indicates that syllable weight does not play a role in determining preference for the trochaic pattern. However, there was a lack of a significant difference over the preference of SW over WS when the strong syllable was heavy. This is interpreted therefore as a preference for both strong syllables and a trochaic pattern on the part of English learning infants.

As one can notice that, most of the work on L1 speech perception has been done with English, a language with a trochaic rhythmic pattern. In order to test whether this preference for SW structures is a universal or language specific development, a replication of these experiments with languages with a non-trochaic pattern is required. We can conclude that prosodic information is used by children as young as seven months to help them in their word segmentation, at least at a first pass, and that other non-prosodic information is needed to help them identify words later on starting at eleven months. It is also that, the strategies they are using for speech segmentation are both top-down, as they perceive larger units before they perceive smaller units, but also bottom-up, as linguistic units like the syllable are already present at birth and preference for a particular type of rhythm is ready present at nine months.

2.5.3 Perception in relation to production in L2 Phonology

Many sounds in L2 differ systematically from their nearest counterpart in L1. The acoustic differences of the similar sounds in two languages can be regarded as deriving from language specific realisation rules that have been applied to 'universal' or innately specific sounds types used to implement phonetic counters (Chomsky and Halle 1968).

Native speakers of different languages develop different phonetic representations to motorically produce and auditory perceive the sounds they have been exposed to during L1 acquisition (Port and Mitleb 1983). Other L2 sounds may not bear sufficient resemblance to any L1 sound at an acoustic, auditory, or articulatory level and they might be referred to as new sounds.

Any two languages may also differ according to the combination or sequences of sounds. Or they may differ in the extent to which adjacent sounds are articulated. They may differ in the kinds of syllables used to form words. Languages may differ in

phonotactic constraints, which determine the sound sequence occurring within each sound type.

Most languages manifest important prosodic and rhythmic differences, which can be described as patterns of fundamental frequency, intensity, and duration affecting more than a single segment (Lehiste 1970). It is generally assumed that the greater the linguistic distance between L1 and L2, the more difficult it will be for the learner to pronounce the L2 like a native speaker (Bannert, Engstrand, Eriksson and Nordstrand 1982).

It seems that most researchers would conclude that the interlanguage phonology of L2 learners differs from that of L1 native speakers' NL if it could be shown that the learner perceives an L2 sound differently from L1 native speakers. Several studies have indicated that foreign accent leads to negative evaluation; other studies have suggested that foreign accent may have a negative effect on how L2 learners will be evaluated, despite the fact that few individuals learn to speak L2 with an accent.

Most research findings are related to the cross language perception and production of voice onset time (VOT). Listeners have been found to separate a continuum of VOT-varying stimuli into categories corresponding to the stop consonant system of the L1. So L1 plays a considerable role in L2 prosodic level. An experimental study led to the conclusion that listeners' perception of L2 intonation reflected a combination of intonation transfer from L1.

It is shown from a large body of research over the last few decades that the phoneme status in the real time processing of spoken language is problematic, although it may be useful construct in linguistic description (Pisoni, Logan and Lively 1990; Pisoni and Luce 1987). The observed patterns of L2 pronunciation learning could be accounted for in terms not only of contrastive analysis of the phoneme inventories of L1 and L2. Rather, the relative difficulty of learning a sound could be explained by reference to full analysis at the phonetic level (Briere 1968).

For misperception states and production, Nemser (1971) noted a frequency association of dissimilar perceptual and productive patterns: the Hungarian subjects tended to perceive the English interdentals as labial fricatives, to produce them as stops, and to imitate them as either sibilants or stops or fricatives. This dissociation of

perceptual and productive patterns again argues against a simple phoneme-based model of L1-L2 transfer. I expect our learners to show different level of mastery over perception and production in various tasks.

There are some studies which show dissociation between production and perception, as well as ones which indicate that learners produce phonetic forms which they cannot discriminate or identify.

It is clear from these studies that perception creates less difficulty than production. This goes with the assumption that in L1 acquisition the child's substitutions are due to difficulties concerning the learners' productive skill rather than perceptive ability. One can also postulate that Arabic learners perceive most of the vowels and recognise them, but they can not as yet translate them into production. For example, we might assume that L2 learners of English have not mapped the target representation of the vowel /e/ in their interphonological vowel space, though they can recognise it perceptually. The vowel /e/ is a complex segment in its own right in that it is half-way between the high and low vowel dimensions. Its articulation is not simple, because it entails more than one articulatory involvement in addition to structural relations among these gestures.

This interphonological rule of /e/ to /i/ could be because our learners have judged the phonetically different segments /e/ and /i/ to be members of the same category (high front vowel) as part of a perceptual strategy, because of the auditory and articulatory similarity characterising these vowels. L2 learners would fail to come up with production of a segment either because it does not exist in their repertoire or it is phonetically complex.

Dresher & Larkins (1980) claim that perception and production ability, in acquiring the first and second languages, is related. In first language acquisition, Vihman (1992), Werker & Pegg (1992) stated that there is a relationship between perception and production, given that language-specific influences on perception seem to parallel that seen for production at around the age of 6-12 months. Werker (1993) noted that the direction of this influence is not yet known, and that it could be the case that the influence is only unidirectional. This means that perceptual returning directs vocal production. She also supposed that the influence could be bi-directional, given that the language-specific

influences on perception of prosody in early infancy direct the child's attempts to reproduce prosodic elements such as intonation and other prosodic features.

Bever (1981) indicated that speech perception and production develop independently in second language acquisition. Bever shows that in first language acquisition a psychogrammar 'equilibrates' perception and production development. He further claims that once production and perception are brought into alignment, and there is no ongoing learning activity when the role of psychogrammar ceases, perception and production become independent and the critical period for speech learning ends. This results in the difficulty post-puberty language learners' experience. This view is rejected by Flege 1999 as he is arguing that one would not expect to observe correlations between measures of post-critical period L2 learners' production and perception of L2 vowels and consonants. However, results of most recent studies show significant correlation between perception and production abilities.

Sheldon & Strange (1982) conclude that Japanese learners' production of English /r/ and /l/ contrast was more native-like in their production than their perception. This could be interpreted as an effect of conscious training or the effect of the testing procedures, i.e mimicking rather than acquiring the target form. However there are a number of studies in second language acquisition that support the view that perception precedes production. Major (1981) claimed that learners with good perceptual ability of L2 have a mental representation identical to that of native and they will gradually proceed to produce forms closer to the TL. The case is different where learners with poor perception need to improve their perception before production. Major has tested the perception and the production of English vowels by Brazilians whose overall pronunciation of the TL was relatively good or poor and found that /a/ produced by students with mild accents were more intelligible than the /a/'s produced by students with stronger accents.

Flege (1981) tested three groups of learners: monolingual speakers of English and Taiwanese English speakers who had lived in the US for an average of 1.5 years, and 5.3 years. The subjects rated the foreignness of English sentences produced with various degrees of foreign accent. It is found that the subject group which had lived in the US longer were more sensitive perceptually to the phonetic characteristics of English. The

subjects' production was also evaluated and it was found that the two non-native groups spoke with an equally foreign accent. Taking together the results of the perception and production experiment, Flege found that the perception of L2 sounds may be more accurate than learners' production, which is consistent with the hypothesis that perception leads production in L2 acquisition.

Other studies found that perceptual ability and productive ability were related in that the better the learners perceived English, the better they were at producing it. Flege & Schmidit (1995) examined the voice onset time (VOT) feature in production and perception of word-initial English stop consonants. They tested forty native speakers of Spanish who had arrived in the US as young adults. They had subjects assess the accuracy of the synthetic continua with varying degrees of VOT. They found that the correlation between the VOT values produced by the proficient participants and their perceptually preferred VOT values were significantly correlated. This finding suggests again that as non-native adults become proficient in a second language, their production and perception are related.

As discussed earlier, Oyama (1973) examined sixty US immigrants from Italy. Subjects had lived in the States from five to eight years and their ages at arrival were between six and twenty years old. Native speakers of English were assessed the subjects' degree of foreign accent in paragraph-length speech samples. For sentence perception subjects repeated as many words as possible in a set of English sentences presented in noise. It was shown that the more accurately the native Italian English speakers were able to produce English sounds, the larger the number of words they were able to repeat in noise.

Meador, Flege, and Mackay (1997) examined 54 Italian immigrants to Canada who arrived in the country between the ages of three and twenty-three and had lived there for an average of thirty-four years. The subjects were asked to repeat the words of a sentence presented. They found that the more accurately the participants pronounced English sentences, the larger the number of words they were able to repeat. This showed that perceptual ability and productive ability were related in that the better the subjects pronounced English, the better they were at comprehending English utterances. They claimed that the correlation reported may actually have underestimated the relationship

between the participants' ability to perceive and produce the vowels and consonants in the sentences, because individual differences in phonological short term memory may have affected the results. They then tested participants, by having them repeat non words formed by concatenating two to five Italian CV syllables. As variation in the test was partial led out, they found a closer correlation between perception and production abilities.

Flege, Bohn, and Jang (1997) examined twenty speakers of German, Spanish, Mandarin and Korean who were rated as relatively experienced or experienced based on their length of stay in the US. Target language vowels were embedded in a list of (CVC) consonants-vowel-consonants English words containing one of / i, ɪ, ɛ, æ /. The eighty subjects' accuracy in producing English vowels was tested with acoustic measurement and also by English native speakers. Vowel production accuracy was measured by size of the spectral (F1,F2) difference that the participants produced between /i/ - /ɪ/ , /ɛ/ - /æ/, then native judges were asked to identify which vowels in synthetic beat-bit and bat-bet continua. The perception test was a two-alternative forced-choice recognition test. Results of their study showed that relatively experienced non-native subjects both produced and perceived English vowels more accurately than inexperienced subjects. Multiple regression analyses showed that non-native subjects' accuracy in producing English vowels related to their success in perceiving the same English vowels in advance.

Champagne-Muzar, Schneiderman, and Bourdages (1988) tried to test whether perceptual training induces better production performance. They carried out tests included discrimination and production of French phones, rhythm and prosody by learners of various L1 backgrounds. They examined two subject groups, one group of twelve subjects who underwent a phonetic training session and a control group consisting of seven subjects who did not get the training. The training programme consisted of twelve one-hour, tape-recorded lessons, accompanied by a workbook. In the first six lessons, the learners were introduced (with the help of graphic representations of intonation and rhythmic contours) to segmental and suprasegmental aspects of French through a series of discrimination exercises. The training did not include oral production. While the training session was administered to the test subjects, the control group spent their laboratory periods doing listening comprehension exercises. Testing took place

before the start of the French course, in which both groups were enrolled simultaneously, and at the end of the semester immediately after they had finished the course. Testing procedures included three types of discrimination tests and two production tests, which measured the ability to imitate French phones. Native speakers examined the production data with five point scales with end points labelled as native and non-native. The results showed that there is a positive a correlation between discrimination and production ability and they also showed that improved discrimination abilities would result in more native-like production.

These results were confirmed by Bradlow, Posoni, Yamada, and Tohkura (1996) in showing that perceptual training induces more accurate production of the L2 contrasts in the absence of speech production training. The evidence supports the view that correct perception of the TL is important for successful production of a second language. They investigated the acquisition of English / r-l / contrast by 11 adult Japanese learners who had gone through a perceptual training programme for the contrast. They had 12 Japanese speakers as a control group. The two groups were tested for their perception and production before and after /r-l/ identification training using a high- variability presentation format. The training programme had 45 sessions over a period of 3-4 weeks of perceptual identification with feedback. The post-test phase included a perceptual identification test and two tests of generalisation. The tests of generalisation consisted of a minimal word pair identification task with novel words spoken by new speaker and novel words produced by one of the speakers used in creating the training stimuli.

The experimental group got significant perceptual learning as a result of the programme, showing from 65% correct identification to 83% correct identification. This perceptual learning generalized to novel items spoken by new talkers. Improvement in the subjects' production as a consequence of perceptual training was evaluated using two tests. The first was paired-comparison of the pre-test and post-test tokens. Native-speaker judges were asked to evaluate which version of the target word sounded better using a 7 scaling technique. The results of the judgement test by native speakers showed significant improvement in the test subjects' perceived rating of /r/ and /l/ production as a consequence of perceptual training. This method was used as it was expected to be sensitive to small differences in articulation.

The second test was a minimal-pair identification task which gives information about a change in speech intelligibility specifically related to improved /r/ and /l/ articulation. Results showed that the post test productions were more accurately identified by English learners than the pre-test production in two-alternative minimal-pair identification test. They concluded that the knowledge gained during training for /r-l/ contrast transferred to the production domain.

This leads to the conclusion that in SLA, learners overall pronunciation of their second language and their perception ability are related, and perception precedes production in L2 phonology.

We can further conclude that biological maturation affects interlanguage phonology in the development of perceptual abilities in both first and second language acquisition. Based on the assumption that perceptive and productive ability is closely related we further suggest, mis-perception of a target language is to be the cause for L2 learners' non-final attainment in L2 phonology. These findings could apply in foreign language situations as well. I strongly argue that without a parallel study of both perception and production of learners longitudinally or cross-sectionally, no fruitful results can be obtained. The study of both abilities will shed light on the relative role of these two component features of interlanguage phonology.

2.5.4 Incorrect perception and production and intelligibility

Perception studies suggest that native listeners are sensitive to various properties of non-native utterances which diverge from the native norm when they are asked to evaluate the accentedness or acceptability of L2 learner' productions. There are no attempts to prove the contrary although many native speakers undergo exchange conversations with non-native speakers with ease.

Results of some studies have shown that prosodic characteristics may be one of the most important features in the perception of foreign accent, and that perceived foreign accent is related to reduced intelligibility of accented speech for native listeners. This leads to the assumption that prosodic features may be more important than other features in the perception of foreign accent (Anderson-Hsieh, Johnson & Koehler (1992).

Cutler (1976), Cutler & Norris (1988), among others, have shown that prosodic information, such as the pitch contours of an utterance, focus a listener's attention on the location in a sentence of important information: prosodic information influences word identification by directing the listener's attention to particular items in an utterance. Cutler & Norris (1988) have shown that prosody can play a role in lexical segmentation for speakers of languages in which it is predictable cue to word boundaries. For example, English as a stress-timed language comprises sequences of strong and weak syllables. Strong syllables are most likely to signal the beginning of content word, while rhythm in French is syllable-timed. This difference of prosodic structure between two languages was found to reflect native speaker's segmentation strategies. As prosodic features affect perceptual processing in language specific way, these features must be mastered by learners for as highly as possible.

Akita (2001) cited that experienced ESL teachers were asked to rate the speech produced by 60 French native speakers learning English. The authors analysed the scores with respect to three phonetic attributes: segments, syllable structure, and prosody. A multiple regression analysis revealed that all three variables played a significant role in predicting the pronunciation ratings, but the prosodic variable seemed to have the strongest regression coefficient. This indicates the importance of prosody.

It was similarly shown in a study carried out by Magen (1998) assessing the contribution of various phonetic and phonological factors to the perception of global foreign accent. Two fluent, heavily accented Spanish learners of English, recorded English phrases containing sounds or sequences of sounds suggested to be difficult for native speakers of Spanish. Where factors investigated included those affecting syllable structure (initial epenthetic schwa, non-initial epenthetic schwa); those affecting vowel quality (vowel reduction, tense-laxness) ; those affecting consonants (final [s] deletion, manner [ch-sh] fricative voicing, [z-s] stop voicing; those affecting stress (lexical and phrasal stress). These processes affect syllable structure.

Native listeners rated the degree of foreign accentedness of Spanish-accented speech and the acoustically edited speech for each factor which was suspected to contribute to foreignness. It was found that listener were sensitive to syllable structure, final [s] deletion, consonant manner and lexical and phrasal stress, but were not sensitive

to voicing differences. Thus we can conclude that suprasegmental factors, including syllable structure and lexical and phrasal stress, consistently contribute to native listener's perception of accentedness.

In learning English as a target language, Adams (1979) Nelson (1982), and Kenworthy (1987) claimed that inappropriate timing of syllable and inappropriate patterns of stress alternation account for a much of the intelligibility failure of L2 learners' productions. Tiffen (1992) also concluded that the strongest cause of intelligibility deficits for Nigerian speakers' English was rhythmic/stress errors, followed by segmental, phonotactic, and lexical/syntactic errors. Suenobu, Kanzaki & Yamane (1992) showed that intelligibility of Japanese-accented English was lowest when it was analysed with respect to consonant deletion, followed by inappropriate accentuation of words. Hutchinson (1973) reported that Spanish learners who maintained a greater durational contrast between English stressed and unstressed syllables were given better pronunciation ratings by native listeners than learners who spoke English with smaller durational contrasts.

On instrumental analysis of non-native speech, Tajima, Port & Dalby (1997) provided instrumental data which directly investigated the relationship between possible acoustic-phonetic properties of foreign accented speech and intelligibility. Their method was 'speech transformation method' which was previously adopted by Osberger & Levitt (1979). In this analysis, speech stimuli were instrumentally modified to match normal production in specific acoustic dimensions so that their effects on intelligibility could be evaluated. Short English phrases were produced by a Chinese speaker of English and by a native English speaker. The use of objective methods involving speech coding and resynthesis, as in Atal & Hanauer 1971, along with dynamic time-warping as in Rabiner, Rosenberg & Levinson (1978), the Chinese speaker's productions were temporally modified so that the duration of acoustic segments matched the duration of corresponding segments in the native speaker's productions, while retaining the spectral and source characteristics of the original speech data. It is assumed that modifications to the duration of individual acoustic segments simultaneously affect higher-order temporal features, such as syllable shape and global rhythmic properties. Thus their interest was in the combined effect of 'temporally defined properties' on intelligibility. Hutchinson (1973)

further noted that there seemed to be a generally observed tendency by non-native speakers to reduce the durational contrast between English stressed and unstressed syllables. In disyllabic words, the first vocalic segment in each word (stressed) had an average of 13 ms in the non-native productions, with an average of 90ms.

In another experiment, the native speaker's speech was modified (distorted) to match the Chinese-accented productions. 36 native speakers of American English were recruited for a listening test to assess the effect of temporal modification on intelligibility. They listened to four types of productions: the original Chinese speaker version (OC), original English speaker version (OE), temporally corrected Chinese version (TCC) and the temporally distorted English version (TDE). The test was a four-alternative forced-choice identification test. The choices included: the correct phrase, plus three phonetically similar distracter phrase which were suggested by a different panel of listeners. The obtained intelligibility was quantified as percent correct recognition of the phrases in the test. To avoid ceiling effects in listeners' performances on the OE tokens, the stimuli were presented with background 'cafeteria noise'.

Results were that intelligibility of the OC was poor, (39% correct), but improved significantly to (58%) after temporal modification. By contrast, performance on the OE was high (94%), but declined significantly (83%) after temporal distortion according to the Chinese speaker's timing. These results suggest that the native listener's ability to recognise English phrases is significantly influenced by whether or not the phrase has appropriate native-like temporal properties, which provides some quantitative support for claims that have been made regarding the role of speech timing and rhythm on the intelligibility of foreign-accented utterances. This was approved by Nelson (1982), and Kenworthy (1987). They also suggested implications for language teaching in expressing the idea that intelligibility of foreign language speakers may be enhanced if explicit training is provided on temporal properties of their speech.

One can conclude that these results indicate that native listeners are selectively responsive to non-native utterances which diverge from native norm. It is also shown that prosodic characteristics have had important features in perception of foreign accent and that perceived foreign accent results in reduced intelligibility. However, such findings are not easy to be applied. It was reported by Leather & James (1991) that at the segmental

level transfer is prominent only during the early stages of acquisition, while transfer persists well into advanced stages of acquisition with respect to prosodic structure. This indicates that prosody is more difficult than other areas in learning processes.

Thus we can note that the foreign accentedness in prosody contributes to serious intelligibility deficits. It also seems that this area is the most difficult to acquire, as native-like mastery level. However studies also suggest that providing L2 learners with input enhancement in the shape of perceptual (and production) training can make L2 learners' production more intelligible. However, L2 learners of English phonology may mis-set some parameters due to incorrect perception. Similarly, the Libyan learners of English studied in the present thesis are predicted to have difficulty in resetting parameters due to insufficient target language input.

2.6 Foreign Language teaching and input

The aim of language learning and teaching is to develop a high level of competence in the four skills required for activity in interaction and controlling a mechanism of speech at a certain level. Unless the skills of listening, speaking, reading, writing are practised in relation to each other failure may exist at any level.

The overall aim of language teaching is to develop a high level of competence that enables the learner to communicate effectively. However some problems occur at any level of language use. First language and second language learning processes do not follow the same route in their development. First language is acquired naturally whereas second language is usually learnt under instruction and supervision.

Native language and target language have their effects on each other. These effects might yield positive or negative results. Native language has been traditionally regarded as the cause of all learners' problems. Furthermore it is considered the major difficulty in the learner's mastery of the target language at a high level of competency, though problems occur as a result of previous experience and knowledge of the native language in relation to the new aspects and levels of target language. In spite of the long debate about a generalized theory of second language errors as shown in some difficulties and problems, linguists generally agree that both languages have their effects on each

other, but the process of second language learning is not driven by the first language's. In other words, a new emerging system is the norm.

Problems of second language are clear in the individual's communicative skills, which have emerged as the result of features such as interference and transfer. Interference has been used to refer to psychological and sociological uses. Its psychological use refers to the influence of old habits when new ones are being learnt, whereas its sociological use refers to interaction resulting from language contact such as linguistic borrowing and language switching.

Transfer in language usage is another problem, and several interpretations of transfer result in some confusion with contrastive analysis. From the behaviourist psychological view, both positive and negative transfer refer to the automatic and subconscious use of old behaviour in new learning situations. According to educational psychologists, transfer is the use of past knowledge and experience in new situations. Present research results suggest that the major impact the first language has on second language acquisition may be to do with accent.

Theories of language learning and teaching emphasis the role of cognitive abilities in developing the skills required. Here we can accept that the learner is equipped with a language acquisition device (LAD) that enables him/her to acquire any language, and this is an innate ability. But without other factors, this device cannot operate. Chomsky (1957) has proposed the notion of competence and performance as the basis for something universal. This sort of capacity in what we know about a language and what we do in a language has been an open question for further investigations.

In the 1950s, the behaviourist view interpreted the process of learning through the notions of imitation and reinforcement. Learners were thought to establish a set of habits in the new language. This was how the L1 was seen to have a great influence on the course of L2 learning. Behaviourists argue that similarities between languages cause positive transfer whereas differences cause negative transfer. In the learning process, this is known as interference and errors are dealt with according to this fact. Their main goal was to develop and form new linguistic habits through practice where they try to eliminate errors caused by interference. As we saw, his view led to the contrastive analysis hypothesis that compares the two languages to predict areas of difficulties. This

kind of analysis is dated in terms of its assumptions about the learner, and it also only explains a small part of the process in foreign language learning.

Cognitivists, on the other hand, assume that learners use their cognitive ability in a creative way to work out a hypothesis about the structure of the foreign language. The process of language learning, though, occurs in a series of transitional stages. In this view learners control a new system. This system is not equivalent to their first or to the target language. It is an interlanguage system. And it has new features. In this approach errors play an important role, as they provide fruitful results. But still this approach cannot provide a complete explanation.

Fries (1957) mentions that before asking any the questions about how to teach a foreign language, one must come to the much more important preliminary work, of finding the special problems arising out of any effort to develop a new set of language habits against a background of different native language habits. A child in learning their native language has learned not only to attend to (receptively and productively) the particular contrast that function as signals in that language; they have learned to ignore all those features that do not so function.

Learning a second language, therefore, constitutes a very different task from learning the first language. The basic problems arise not out of any essential difficulty in the features of the new language itself but primarily out of the special set created by the first language habits, since the first language affects the second language and plays a major role in learning the second one.

Second language researchers have dealt less often with language learning outside the classroom in a target language environment. By contrast, there are a lot of studies that deal with language learning inside the classroom and language learning in foreign language environment. Many studies have dealt with second language phonology in terms of learners' age, motivation, experience, and the like. But not many attempts have been made on the learner's exposure to foreign accent at target language environment as a natural process. Only recently have some works dealt with the systematic changes learners undergo in the TL environment.

The input factor has a major effect on second language acquisition, especially in non-native settings. The amount of input learners are exposed to affects second language

acquisition. Hamayan, Genesee and Tucker (1977) examined language exposure factors related to learners of French as a second language. They looked at three groups of learners: early immersion, late immersion and non-immersion. The early immersion group performed better than students of other groups.

The amount of input might not be sufficient for learners. This input is typically from two sources: aural input from teachers and aural input from classmates. A non-native teacher transfers foreign accent to the pupils. Learners practice distorted input when exposed to their peers' pronunciation. In this case, learners are exposed to less input than children. Young-Scholten (1995) refers to this input as positive evidence with negative effect.

Adults differ from children in pronunciation in terms of the amount of input. Adults are typically exposed to much less phonological input than children in a natural environment. L2 learners may be in an environment where they are only exposed to several hours of instruction plus materials in TV programmes. Despite some people using English in daily conversation in non-target settings, the lack of native speakers is insufficient input.

Therefore informal exposure is very important in L2 native-like mastery. Suter (1976) indicated that informal exposure is more important than formal exposure especially in the development of some second language skills. Suter found that Japanese learners of English gained low scores among other various mother tongue learners. Arabic and Persian speakers had high or middle scores.

The amount of previous input was not investigated by researchers. This L1 input includes language variety, as in the case of Arabic, there being MSA and LA. (cf. chapter 3 below). This kind of input has a major effect on L2 perception and production.

Akita (1999) carried out a longitudinal study to examine the effect of primary linguistic data over time on learners who had received a limited amount of input, often foreign-accented. Her study looked at three major sub-components of phonology: segmental features, syllable structure and metrical stress. Data were collected from three Japanese EFL learners in the UK. The results showed that the learner with the lowest proficiency at the start of data collection demonstrated the most improvement in areas where other learners also exhibited improvement, in segments and syllables.

She recommended that further data is needed to account for individual learner differences and assumed that there are methodological difficulties in accurately qualifying what learners have actually heard as input. She adds that it would be desirable in future studies to obtain more information about the learner's language intake. There is also a need for production data to model how L2 input affects reconstruction L2 competence. This leads to a correlation of two abilities, and examining the learning stages and the triggers for moving to new stages. For instance, the relevance of prosodic interference to segmental and syllable level processes.

Akita (2000) collected production data in a longitudinal study from three Japanese subjects. She tried to investigate what effect exposure to "positive evidence with a positive effect" has on adult L2 learners who had received mostly foreign–accented input during their foreign language experience. She also tried to find out whether their L2 phonology underwent any changes. It is concluded that it is possible for L2 learners to improve their L2 phonology in the target settings, even once they appeared to be fossilised. The most important striking point is that the acquisition of vowel reduction is the key to the L2 acquisition of certain prosodic features, as is the timing of the falling pitch. It reveals an interaction of a segmental process and prosodic process. She recommended an investigation on how syllable level process interacts with segmental and prosodic process.

In dealing with a natural setting what effects are there when a foreign language learner is exposed to a target language environment? In other words, what kind of changes do they undergo in their linguistic knowledge if there are any, and to what extent? Furthermore, are there any other variables that might have an effect on the process? These could be accounted for by age, and the like. This issue could be applied to different levels and components of language.

It seems that the subject matter of such research is very sensitive as its variables are very wide and integrated with each other. Furthermore many variables need to be controlled for the accuracy of the results both at the level of subjects tested as well as at the level of the testing instrument. One major important factor is orthography. This factor might have a negative effect on our data in dealing with the skills such as production and

perception. I argue that this factor be thought of as the orthographic paradox, analogous to the observer paradox in Labovian studies.

Thus we assume that the less orthographic effect we have the more accurate results we get. Another factor is the amount of learner's exposure to the target language. This includes his interaction with native speakers of the target language, his/her attitude about the language and its environment. I argue that more control on some other factors in regard to the learner's exposure to the target language is needed, especially the time spent in actual engagement in target language activity in both perception and production, and the time of first exposure to target language environment.

I will consider teaching English as a foreign language in an L1 setting as learners' previous input, in addition to L1 varieties. This will give an interlanguage system of phonological competence of my informants. Then I will trace the input in target language settings to show the changes on learners' phonological competence.

2.7 Language of a second phonology

Bloomfield (1933) states that it is important to remember that practical phonetics and phonology presuppose knowledge of meanings: without this knowledge, we could not ascertain the phonemic features. The description of a language, then, begins with phonology, which defines each phoneme and states what combinations occur.

Phonology includes the sound patterns of a language at three levels. They could be represented as consonants, vowels, and prosody. Consonants can be thought of as defining a boundary, or margin, around a vowel nucleus. The vowels of a language, which function as the centre or core of words and their component units of syllables, are the main carriers of prosody. Vowels therefore are closer to prosody than consonants. Prosody comprises the patterns of pitch, duration (length of units) and amplitude (loudness or volume) on individual words and longer stretches of speech, and the ways in which these patterns interact with silence (pause) to produce meaningful language.

These define language-specific patterns of tone (lexical pitch patterns), intonation (grammatical pitch patterns), rhythm (patterns of units, including pause, of different duration), and stress (patterns of units of intensity, or force of articulation). Furthermore, prosody comprises all those aspects of speech that span more than one segment

(consonant or vowel), such as nasality, a loud voice overall, or a generally tense or lax posture of the vocal cords causing the pitch of all sounds to be raised (tense vocal setting) or lowered (lax vocal setting).

Thus prosody defines and disambiguates the continuous and discontinuous units of speech that occur as thought units or idea units between pauses; vowels define a centre of nucleus of words and carry tone, intonation, rhythm, and stress; and consonants define and disambiguate the edges of words. Each of these aspects of phonology, however, is essential for production and perception of the units of speech (Pennington 1999, Chafe 1980).

Interlanguage phonology has been studied by researchers in second language learning, and dealt with as a new sound system or as a mixture of two different sounds in language (cf. Selinker 1972, Lado 1957, Selinker 1992, Archibald 1998, Fokes and Bond 1989, Eckman 1981, Sato 1984, Tarone 1980, Flege 1988).

At points where the sound systems of two languages differ most, language learners have less trouble than they do where the sound systems are similar but not identical (Flege 1988).

Dittmar, Spolsky and Walters (1998) state that for the foreign language's learner with restricted exposure the only available input may be from the teacher and non-native peers. In richer, more natural-language learning environments, there will be an even wider choice of target models, provided by the media, workplace or school contacts. In a second language situation, the range is considerable, including potentially the full repertoire of the speech community concerned. Immigrant language learners are often faced with a choice between the normative model of their classroom and quite different vernacular norms they meet outside it.

Young-Scholten (1995) points out that the aural input learners in a foreign language classroom receive from their teachers and their peers is primary linguistic data and functions as positive evidence. A problem arises with positive evidence in the classroom when the input constitutes an accent which deviates from whatever standard the learners are expected to acquire.

Non-native accented input is thus positive evidence with negative effect, at least in terms of the researcher's desire to measure whether the L2 phonology has been

acquired. Assessing L2 phonology is an even riskier endeavour when a nativized variety of the L2 exists. The classroom input could nonetheless be mis-directive if the teacher engages consistently in "teacher talk". The phonological characteristics of teacher talk in, for example, English include an absence of assimilation, reduction and deletions typical of running speech. Word boundaries may be marked by release and/or aspiration of consonants and the vowels in unstressed syllables may not be reduced.

The most important factor in language learning is the input. Young-Scholten mentions that the adult L2 learner may often be exposed to insufficient and restricted input which results in the acquisition of a non-target variety of the target language (TL), which in turn means that learners would be unable to attain native-like competence.

Thus we can conclude that we are facing two facts: one of them is positive evidence with negative effect where there might be no chance of native-like mastery at the phonological level, while the other is positive evidence with positive effect where there will be a chance of ultimate attainment in L2 phonology. Although L2 researchers accept that incomplete attainment of L2 phonology is the norm rather than the exception, many adult learners reach a high level of master, especially when adults learners have access to positive evidence with positive effect. But the effect and the changes are a matter for further research.

Young-Scholten (1994) points out that recent work on the nature of the input required to accomplish the settings of parameters in syntax offers one possible explanation for lack of native-like attainment in L2 phonology. Young-Scholten (1995) argues that we are not currently prepared to answer questions regarding ultimate attainment and access to UG because variables relating to the input the learner has received are generally not controlled for when data are collected. She claims that while much of the L2 phonology research carried out up to now has indeed provided valuable insights into the factors which influence interlanguage phonology, the studies involved are problematic in terms of addressing the issue of ultimate attainment and access to UG.

I argue that the interlanguage phonology of Arabic learners of English can be influenced by the amount of input in the target language settings. Thus the more input learners are exposed to, the less interlanguage grammar we expect. The phonological competence of learners will consist of previous knowledge of Arabic varieties in addition

to exposure to English in NL settings. This phonological competence is represented by perception and production of learners. Therefore I will carry out a discussion of Arabic varieties with reference to the segment, syllable and stress. This mixture will represent the previous knowledge of my learners' interlanguage phonology. However no work has been done so far to represent this kind of analysis.

Chapter Three

Arabic and English phonology

3.1 Introduction

Learners of a second language encounter difficulties in mastering the sound system of the target language. These difficulties are evidenced in various aspects of the phonology, such as segments, syllables or prosody. However, the task of learning differs depending on the language environment, where learners have a better chance of mastering language in target language settings. In other words, learners who are exposed to target language accentuation are more likely to master the pronunciation of the language like a native speaker than those who are taught the language by non-native teachers.

A native speaker of Arabic learning English may make errors in different areas of the language. Hence an Arabic student will not easily perceive or produce the distinction between /p/ and /b/ in English. He/she may make errors in stress and intonation as a result of carrying over some of his own native language phonology into English.

In my study, I am dealing with both production and perception skills where I have to consider the effect of the input and the output. They are affected by the variety of the native language as well as the target language. The learner, however, is exposed to the standard variety in instructed situation, and to the dialect variety interacting with target language individuals in a natural situation.[3]

The learner is exposed to the standard variety and dialects of his/her mother tongue too. In other words, his/her competence has been shaped by the L1 system, and will be affected by the L2 system. We have to consider this mixture of language systems

[3] Perception and production are referred to as a cognitive ability.

when we deal with perception in relation to production. Researchers are dealing with no link to such theories although they seek a unified and comprehensive theory. What follows is a brief description of dialects of Arabic in terms of their segmental and supra-segmental features

Firstly I will introduce Arabic within the Semitic language family. Secondly, I will outline the phonemes of Classical Arabic and of Libyan Arabic, the dialect of my informants, and English. Thirdly, I will discuss the syllable structure of Libyan Arabic and English. Fourthly, I will explain word stress systems of Libyan Arabic and English.

3.2 Arabic within the Semitic family

Arabic belongs to the set of Semitic languages which itself is part of the wider Hamito-Semitic phylum including Ancient Egyptian, Coptic, Cushitic, Osmotic, Beja, Berber and Chadic. Other principal members of the Semitic family are the East Semitic languages of Akkadian and Eblaite (now long dead), and the West Semitic language Aramaic, Ugaritic, the Canaanite languages (including Hebrew), ancient and modern South Arabian, and the Semitic languages of Ethiopia (Tigre, Tigrinya, Amharic and Ge'ez) (See Watson 2002).

3.2.1 The Arabic language

Arabic is the official language in over 20 countries with an estimated 250 million speakers living in an area which extends over a large part of the Near East, across the whole of the Arabian Peninsula, over to the Horn of Africa and along the southern shores of the Mediterranean to the Atlantic seaboard.

The only available evidence of the structure of Arabic before the time of the Prophet Muhammad PBUH (570-632) is found in the pre-Islamic poetry of the early sixth century. In 610 AD Islam settled the often long-standing feuds between the different tribes and united the Arabs of Peninsula and beyond into the first Islamic state. The Holy Quran also challenged the most eloquent of the Arab tribes by establishing itself as the model of the most eloquent language. Thus the Holy Quran and early poetry are the main sources of evidence available on the form of Arabic existent during the premediaeval

period. They both provide a near complete picture of the linguistic situation prevalent at that time.

Modern Standard Arabic (MSA), which is also known as Modern Literary Arabic and Modern Written Arabic, is the modern standard of the classical language. It continues to a large extent the grammatical traditions of the classical language but it also incorporates syntactic, stylistic and vocabulary innovations. It is formally learned in schools and universities and it is the language of formal education in every Arab country, which goes much of the way to explaining shared intelligibility among Arabs. MSA is used in formal communication, in media broadcasts and formal address and speeches. Proficiency in its use, however, depends to a large extent on the level of education of the user. This variety continues to unite the Arab world linguistically and is the overt manifestation of a common heritage, culture and in most cases religion.

A great variety of phonological properties of Semitic languages have been studied within modern phonological frameworks. According to Hoberman (1995) these languages have attracted the attention of phonologists for several reasons: firstly, Semitic languages exhibit phonetic properties, especially the use of the pharynx as a main or secondary place of articulation, that are rare in many other languages of the world. Secondly, Semitic languages are known for the discontinuous or non-concatenative structures that pervade their morphologies and interact in many ways with their phonologies. Thirdly, the Semitic family consists of a group of closely related languages which are fundamentally similar, but nevertheless exhibit a wide variation in phonological structure; this especially is salient within the Arabic language family, where classical or standard Arabic is essentially identical to the ancestor of the many vernacular dialects, most of which are similar in their inventions of segment types and features but diverse in such properties as syllable structure and word stress. Fourthly, there is a long history of study of many of these languages, beginning with sophisticated and hotly argued debates among Arabic and Hebrew grammarians within the Western philological tradition and with excellent structuralist work including several superb structuralist grammars. Consequently it has been possible to propose and test analytical hypotheses with relative ease, compared to many other non-Western languages.

3.2.2 Arabic dialects

MSA and regional dialects normally exist side by side in Arab countries with each variety performing distinct function. The spread of radio and television has increased the exposure of people to the two varieties, both within the borders of individual countries and beyond with the added availability of satellite technology (Al-Ageli 1996).

The standard norm and the colloquial are two varieties that exist in both written and spoken forms. In written Arabic the choice between the standard and the colloquial appears to be relatively uncomplicated. However, in spoken Arabic, the situation is more complicated. There are two varieties of the language, the classical standard, usually called /fusha/ and the colloquial language, usually called /Ammiyya/ and in Western publications, dialect or vernacular. The standard language is used for written speech and for formal spoken speech, whereas the colloquial language is used for informal speech. In contrast to many other standard languages, people only learn standard Arabic when they go to school.

Ferguson (1959) used the term high and low varieties to describe this kind of situation. The low variety is common or vulgar whereas the high variety is the language of culture. The low variety is the mother tongue of all speakers. This framework has been refined by subsequent studies in three important respects. Firstly, Ferguson's model restricted the notion of diglossia to situations where the low variety was genetically related to the high variety, of which it was a simplified version. This restriction was lifted, and the notion of diglossia was expanded to include any functional distribution of linguistic varieties, whether these were languages, dialects or registers. Secondly, the existence of a functional distribution between varieties does not imply that all speakers have an equal command of these varieties. In extreme cases, most speakers know only one variety, a non-prestigious colloquial kind of language, whereas small elite uses a stilted variety of a cultural language, mostly an imported one. Thirdly, in Ferguson's model the two varieties are mutually exclusive, and the speaker has to choose one or the other through a process of code switching. In fact the speaker never opts wholly for one variety or the other, but rather moves along a continuum of speech, of which the two

varieties are only the extremes. In such a situation, code-switching does not imply selecting a discrete variety, but positioning one utterance along a scale of linguistic variation (Versteegh 1997).

This mixture of language varieties causes problems in dealing with perception and production skills of Libyan learners. However the role of MSA on LA is not clear yet due to the shortage of studies. In testing learners' ability I have to deal with aspects related to the high and the low variety. Therefore I will introduce Arabic varieties in terms of their syllable structure and stress. However there were not studies that consider this issue in testing learners' perception and production when they are exposed to foreign language.

Dialects differ from MSA in a number of ways. They may have a reduced and restructured consonant system. Their vowel system may be more complex, and their rules of syllable structure and accentuation may also be different. There are several socio-economic and regional dialects that exist side by side in the Arab world with Literary Arabic. These dialects are mutually comprehensible to a certain extent. However literary Arabic is a unifying element linguistically and in other ways in the Arab world (Alkasimi 1980).

Dialects of a language which has speakers as ethnically and culturally diverse as Arabic cannot be divided purely geographically (Watson 2002). The one clear distinction, which can be made within the Arabic dialect area, is between the Bedouin and the settled dialects. The determining factors are operative within the desert regions of the Arabian Peninsula, Iraq, Syria, Egypt and the Sudan, and the whole of North Africa.

The settled and, in particular, the urban dialects tend to be innovative and succumb readily to external pressures on their phonological and grammatical system. The Bedouin dialects are severely conservative. Universal throughout them is the voiced articulation of the phoneme /q/ as /g/ or /j/ (Irvine 1994:267-270)

Differences among Eastern and Western dialects exist on all linguistic levels. Phonetically the latter have lost many short vowels and reduced long vowels. This change is typical of Tunisia, Algeria, Morocco, but rarely occurs elsewhere in Africa (Libya, the Sudan or Egypt). In addition, in many of these Western dialects the phonemic distinction between s and ṣ as well as between z and ẓ is lost, unlike their parallels in the East. Hetzron (1997)

3.2.3 The phonology of the dialects

Many dialects differ from MSA in that they have a reduced or restructured consonant system but more complexity in their vowel systems. The rules of syllable structure and accentuation are also different. These systems have lost some phonemic distinctions and partially or completely restructured others. /q/ seems to be a significant marker among various dialects of Arabic.

3.2.3.1 Variation among the dialects

According to Holes (1995) there are three salient differences between MSA and the dialects of the region of the Arab World, and between these dialects themselves. These differences are:

(1) the interdentals:

In the Bedouin dialects /d̲/ has been lost, merging with /dh/and /zh/. What happened historically was that the Bedouin and city dialect system restructured the asymmetrical old Arabic system in different ways: the city dialects merged the interdental fricatives with the corresponding set of dental plosives, while the Bedouin dialects reduced the asymmetry of the system by creating a three member set of dental plosives and interdental fricatives in which there is a three way voiced-voiceless emphatic set of contrasts. These are /t/ /d/ , /t̲/ /d̲/, and /θ/ , /ð/.

(2) velars and uvulars, /k/ /q/ / ?/ :

The /k/ and /q/ phonemes developed differently in the city, rural and Bedouin dialects. /q/ became / ?/ in the city dialects of Cairo, Damascus, and Beirut.

(3) the alveolar affricate /j/: The Arabic (ji:m) is usually rendered in MSA as voiced alveolar affricate, but in Egypt it is pronounced as a velar plosive /g/. Rural and Beduin descended groups in the Levant areas generally have an alveolar affricate /j/. Further east in Jordan, the predominant reflex is also /j/, but in many areas of lower Iraq and in the Gulf States in general /j/ varies with/y/.

3.2.3.2 The q as a marker among dialects

The followings are some variations among different varieties of Arabic dialects. They show differences in consonants. This affects the phonological system as a whole, as indicated in (1) below.

(1)

MSA	Variety			Region
qalam (pen)	*galam*	*?alam kalam*	-------	*Palestine.*
qalam	-------	*?alam kalam*	-------	*Lebanon.*
qalam	*galam*	*?alam* --------	-------	*Egypt.*
qalam	*galam*	*?alam* --------	-------	*Jordan.*
qalam	-------	*?alam* --------	-------	*Syria.*
qalam	*galam*		*ġalam*	*Kuwait*
qalam	*galam*	------- *kalam*	*ġalam*	*Libya.*
qalam	*galam*	------- *kalam*	*ġalam*	*Yemen.*

(Yassin 1981:97)

From the above examples we can say that:

The /q/ seems to be a significant marker among various dialects of Arabic. In different dialect types /q/, a voiceless uvular plosive, has become the /g/ voiced velar plosive, or the /k/ voiceless velar plosive, or the /ġ/ voiced uvular fricative, or the / ?/ glottal plosive. The /.. / voiceless alveolar fricative is another marker where it becomes /g/ or /d.. /, a voiced alveolar fricative, or /j/, a semivowel.

Moreover there is a significant change in the articulation of the interdentals, velars and uvulars and affricatives. The most interesting finding is the shift from /q/ to /j/ where a consonant had moved to be a semivowel. This change will effect the perception and production of learners.

3.2.3.3 Prosody in MSA

In suprasegmental dialectal phonology, there are two markers, (1) syllable types and consonant clusters, (2) stress.

All syllables in MSA speech are consonant initial and the basic types are CV, CV: and CVC. Of these, CV is light, and CV: and CVC are heavy. CVCC, CVVC and CVVCC are described as superheavy. Other types – CVCC, CV:C and CV:CC - occur only in pre-pausal position as a consequence of the historical deletion of word-final short vowels. In some dialects, vowel length is governed by natively acquired rules of prosody.

In sequences of two or more CV syllables, in certain sequences of CV and CVC syllable and where CV precedes CV:C, the vowel of the first CV is normally deleted especially if it is /i/. The results are word initial CCV and CCVC, CCV: and CCV:C syllables; data are shown in (3.2.7.1 below).

According to Holes (1995:65), word stress is governed by three principles in Arabic dialects:

i. Stress is predictable and automatic, and determined by syllable structure.

ii. Stress is not syllabically fixed within a given word but is assigned according to whether the word is morphologically unadorned or has a bound morpheme attached to it.

iii. Stress is non-distinctive.

In MSA, no more than one heavy syllable may occur per word and if one occurs, it is stressed. E.g *rija:l* 'men' , *sijill* 'register'. In words of light syllables only, stress assignment depends on the number of syllables in the word.

i.In words of three syllables or less, accent is on the penultimate as in *málik* 'king' *madrása* 'school'. There are two exceptions where some speakers accent antepenultimate CV: if the penultimate is CV viz. *bá:htau*: , and if the penultimate and antepenultimate are both CV, the antepenultimate is stressed as in *háraka* 'movement'.

ii.In words of four or more syllables, the CV: nearest the end of the word is stressed if there is one, as in *muná:saba* 'occasion'. If there is no CV: the antepenultimate is stressed as in *kata'btuhu* 'I wrote it'.

iii.In Arabic dialects, syllable structure is one of the main factors which differentiate one dialect from another. Stress plays a minor role and the dialect rules which express it are similar to each other. However, there are a few conditions in which stress plays a distinctive role in dialects.

According to Mousa (1994), the stress rules of Classical Arabic have a somewhat difficult provenance. In most areas, the colloquial stress rule is applied to Classical Arabic, as in Cairo and Damascus. The following accentuation of the Cairene and Damascene stress rules generally apply to the colloquial:

(2)

Light CV	*kátaba*	'he wrote'.
	bálah.atun	'date' (nom.)
	m`alik	'king'
	h`una	'here'
heavy CVV/CVC	*Yušáariku*	'he participates'.
	mámlakatun	'kingdom' (nom.)
	b`a:rak	'he blessed'
	m`aktab	'office'
Superheavy CVVC/CVCC	*manaadíil*	'handkerchiefs'
	kitáabun	'book' (nom.)
	ba:b`e:n	'two doors'
	mo:lad`e:n	'two feasts'

The rule usually formulated to account for these facts is:

i.Stress a superheavy ultimate, ii. otherwise stress the rightmost nonfinal heavy syllable, iii.otherwise stress the first syllable (McCarthy 1979).

3.2.3.4 Libyan Arabic

As my informants are from Libya, I will give a brief description to this dialect in relation to what is mentioned above. There is a lot of variation among the dialects spoken in Libya, but MSA also plays a major role in Libya. Educated Libyans speak MSA in formal settings, whereas Libyan Arabic (LA) is spoken in non-formal settings. Libya is largely Bedouin–Arabic speaking; even the sedentary dialects of the urban centres such as Tripoli have been influenced by Bedouin speech. Arabic spoken in Western Libya falls under the group of Maghreb dialects. This group includes the dialects of Mauritania (Hassāniyya), Morocco, Algeria, Tunisia and Libya. These dialects can be classified into two groups:

- The eastern pre-Hilālī dialects which are spoken in Libya, Tunisia, and eastern Algeria. They are characterised by the preservation of the three short vowels a, u, i.
- The Western dialects of the pre-Hilālī group which are spoken in western Algeria and Morocco. They are characterised by two short vowels, either /a/, /i/ or /u/ /ə/ as illustrated in (3) below.

North Africa may be regarded as one dialect area because of common features shared by these dialects. These features distinguish them from the rest of the Arabophone world. All Maghreb dialects (except the Eastern sedentary dialects) have a very simple vowel system, with only two short vowels, /a/ and /i/ , and three long vowels /ā/, /ī/, /ū/. In the dialect of Cherchell, this development has gone even further, with only one short vowel remaining.

Stress in Maghreb dialects has shifted in words of the form fa'al, which among other things function as perfect verbs. The standard Arabic primary stress was on the penultimate. Today it is on the final syllable. The developments may have taken place as follows: kátab>kataáb>ktəb 'to write'.

In eastern dialects of Arabic primary stress is on the penultimate syllable. In Maghreb dialects, stress is on the final syllable. The developments were probably as kátab>kataáb>ktəb 'he wrote'

Maghreb dialects have also undergone a restructuring in sequences of their syllable structure. CVCC has changed historically to CCVC, for instance, qabr>qbər 'grave' saqf>sqəf. 'roof' (Versteegh 1997).

Here are some examples from three distinct regions of Libya, Tripoli (TD) in the west and Derna (DD) in the east and Sebha (SD) in the south. The selected sample includes verbs, nouns, and adjectives (cf. Al-Ageli 1996)

(3)

MSA	TD	DD	SD	Gloss.
kátaba	*ktáb*	*kitáb*	*ktáb/kitáb*	*'he wrote'*
fátaħa	*ftáħ*	*fitáħ*	*ftáħ/fitáħ*	*'he opened'*
wálad	*wíld*	*wilád*	*wíld/wilád*	*'a boy'.*
bínt	*bínt*	*bínit*	*bínt/bínit*	*'a girl'.*
tawíil	*twíil*	*tiwíil*	*twíil/tiwíil*	*'long, tall'.*
maksúur	*maksúur*	*maksúur*	*maksúur*	*'broken'.*

We notice from the above examples that differences go beyond the simple replacement of one sound for another. They incorporate structural constituency and importantly also stress assignment as seen from the stress marks. Furthermore, we realize that precise identification and classification are needed to minimize the possible occurrence of incorrect assumptions and generalisations. One can also notice that Libyan varieties play a major role in the language spoken in Libya. Thus it is not easy to build a final conclusion based on the study of one dialect. This finding is important to my study for shedding light on learners' previous knowledge and the changes that will happen in their perception and production.

My learners have LA and MSA as their previous knowledge. In acquiring English syllable and stress, they will be guided by the perception and production process of their L1, but by two dialects. Thus I will carry out a brief study of MSA and LA structure to find out the effect of the exposure to English on learners' phonological competence in terms of language varieties. Furthermore this sort of language variety constitutes the input in L1. Learners have MSA in schools and LA in informal settings.

3.2.4 Segments syllable and stress

Segments, syllable inventory and stress patterns differ from one language to another. Furthermore they differ among dialects of one language. I will introduce segments, syllable and stress of Arabic, the language of my subjects, and English, the target language.

3.2.4.1 Phonemes of MSA

I will introduce MSA and LA in terms of their consonants and vowels. This will show that Arabic varieties have great influence in the production and perception of TL at early stages. But as learners exposed to high amount of TL input, this influence will be less effective. As we will see in the table below (3.1) and (3.2), there is variation among MSA and LA.

3.2.4.1.1 Consonants of MSA

This shows consonants of Modern standard Arabic in terms of their manner of articulation and place of articulation.

Table 3.1

Place of Articulation		***Manner of articulation***				
	Plosive	fricative	affricate	liquid	nasal	glide.
Labial	b				m	w
Labiodental		f				
dental plain	t d	s z		l		
emphatic	ṭ ḍ	ṣ ẓ				
interdental plain		θ dh				
emphatic		za				
Alveolar		š	j	r	n	
Palatal						y
Velar	k g	x ġ				
Uvular	q					
Pharyngeal		ḥ c ≥				
glottal	?/	h				

3.2.4.1.2 Vowels of MSA

Three vowel qualities are distinguished in classical Arabic both in short and long forms.

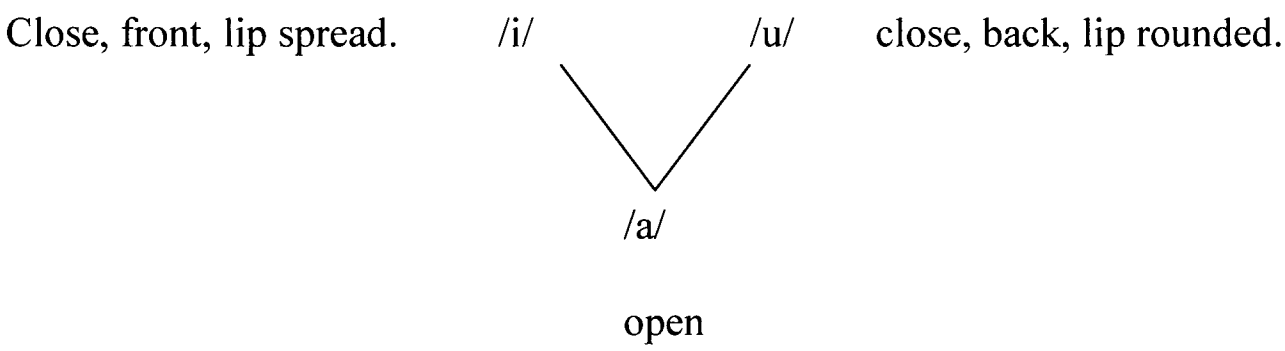

Figure 3.1

3.2.4.2 Phonemes of Libyan Arabic

3.2.4.2.1 Consonants

Table 3.2 shows the consonants of Libyan Arabic (LA) in terms of place and manner of articulation.

Table 3.2

Place of Articulation		***Manner of articulation.***				
	Plosive	fricative	affricate	liquid	nasal	glide.
Labial	b				m	w
Labiodental		f (v)				
dental plain	t d	s z		l		
emphatic	ṭ ḍ	ṣ ẓ				
interdental plain		(d)				
emphatic		za				
Alveolar		š (ž)	j	r	n	
Palatal						y
Velar	k g	x ġ				
Uvular	q					
Pharyngeal		ḥ ≥				
glottal.		h				

3.2.4.2.2 Vowels

Figure 3.2 below shows the vowels of LA.

	Front		**Back**	
	Short	long	short	long
High	i	i :	u	u:
Mid		e:		o:
Low	a	a:	a	a:

Figure 3.2

Phonemes of MSA and LA differ if we consider learners' perception and production. In this case, learners' perception is affected by both MSA and LA but in production learners can apply MSA, LA or even an alternative IL form.

3.2.5 Phonemes of English

3.2.5.1 Consonants of English

Table 3.3 below shows consonants of English in terms of place and manner of articulation.

Table 3.3

Place of articulation	***Manner of articulation***					
	plosive	fricative	affricate	liquid	nasal	glide.
labial	p b				m	w
labiodental		f v				
interdental		- -				
alveolar	t d	s z	č j	l	n	
retroflex				r		
alveo-palatal		- -	- -			
palatal						y
velar	k g				-	
glottal		h				

i/I		u/
e/ɛ	ə/ʌ	o/ɔ
æ		a

Figure 3.3

Gimson (1980)

3.2.6 MSA and English phonemes

Arabic has more consonants than English and many of the Arabic consonants are at the back of the oral tract. The glottal stop is a phoneme in Arabic but not in English. Arabic has only one phoneme in the /d/ area which is pronounced as /ð/ in Libyan dialect.

There are two approximations to the English /h/ in Arabic. The more common of these is an unvoiced, harsh aspiration. /r/ is voiced flap in the Libyan dialect, very unlike

the RP /r/ which is an approximant. /p/ and /b/ are allophonic in Libyan dialect. /v/ and /f/ are allophonic and are usually both pronounced as [f] by Arabic speakers.

Although /θ / and / ð / occur in classical Arabic, most Libyan learners pronounce them as [t] and [d] respectively. The English phoneme /ŋ/ is usually pronounced by Libyan learners as [n] or [ng] or even [nk].

3.2.7 Syllable structure

The syllable plays an important role in phonological theory. According to Clements and Keyser (1983), the syllable is presented as a hierarchical unit consisting of three independent levels of representation. The lowest level consists of a linear sequence of single column phonetic matrices, standard in generative phonology. It is the segmental tier. The second intermediate level, the cv tier, mediates between the segmental tier and the syllable tier, which is the third level. The cv tier differentiates between syllable peaks and non-peaks by c elements.

A syllable is any string of segments that are dominated by the same syllable node. The onset of the syllable consists of all C elements to the left of a V element. A coda is defined as all C elements to the right of a V element.

In acquiring the syllable structure of English, the syllable structure rules which govern Arabic prosodic structure are transferred to the interlanguage of learners. Learners may insert a vowel to break up consonant clusters, or reduce cluster at other times. (Mousa 1994). I expect errors made by learners in the pronunciation of the English words containing the clusters involved CC, CCC in initial and final position. Errors were significant in CC initially and CCC in different positions. Furthermore cluster type may effect epenthesis.

The lack of difficulty in the pronunciation of final CC clusters may be attributed to the fact that Arabic allows such clusters in final position. These clusters did not sound strange to our learners. It also means that learners are mastering the norm of TL. CCC clusters cause a major problem to learners.

3.2.7.1 Syllable structure of Libyan Arabic

Libyan Arabic has the main syllable types in Arabic variety as well as to other structures which are specific for LA only. In many dialects of Arabic, possible syllables are:

(4) CV

CVV

CVC

CVVC

CVCC

Watson (1999)

If we consider the above syllable types, speakers of Arabic will find it difficult to produce initial consonant clusters in English syllable. e.g. cluster, sprite, play, blood, etc. Libyan Arabic allows the following sequences in syllable structure, as shown in Figure 3.4.

Syllable	Arabic	Gloss
1) CV	'katbtu'	'you wrote'
2) CVC	'min'	'from'
3)CCV	'ktabilhaa'	'he wrote to her'
4) CCVC	'ktab'	'wrote'
5) CVV	'laa'	'no'
6) CVVC	'tiin'	'mud'
7) CVCC	'harb'	'war'
8) CCVVC	'traab'	'sand'
9) CCVCC	'fraht'	'I became happy'
10) CCVV	'djne'	'pound'

Figure 3.4

For the sequence of segments within the syllable, sonority governs such combinations. Selkirk (1982) notes that sonority decreases from syllable peak to its margins. Clements (1990) shows the sonority hierarchy as vowels, glides, liquids, nasals. obstruents. Vowels are more sonorous than obstruents. The most sonorous segment tends to go in the nucleus while the less sonorous segments tend to go in the onset or coda. Thus the above sequences do not violate the sonority.

All syllable structures of MSA exist in LA. This leads us to conclude that learners have MSA and LA structure of syllables as part of their perception. However in their production they use one variety or IL. This mechanism effects the perception and production of the TL. My concern is CC and CCC clusters in syllables. These clusters differ in LA and MSA, and they may therefore variably affect the acquisition of English clusters. I will investigate developmental stages of these clusters as learners delete a consonant when they attempt to produce CC and CCC clusters or insert a vowel to break up the sequence of consonants. I will also examine any changes in the phonological competence of our learners in perception and production based on residence in the UK. But before I go further I will give a brief introduction to clusters.

3.2.7.1.1. Two consonant clusters in Libyan Arabic

Two-consonant clusters in LA occur in onset position violating the parameters of MSA. This type of cluster occurs in initial, medial and final position within the word or across morpheme boundaries. The following examples show consonant clusters of LA in various positions.

(5)
Initial:

	gloss
blad	'country'
klab	'dogs'
ġrab	'crow'
shur	'months'
ktub	'books'
ġraf	'rooms'

shrib	'he drank'
sġir	'he became small'
mfatih	'keys'
mbarid	'files'

Medial:

	gloss
silmat	'she is saved'
hfidtu	'you learned'
shirkah	'partnership'
shribtah	'you drank it'

Final:

	gloss
janb	'side'
zind	'forearm'
kanz	'treasure'
bank	'bank'
sanf	'kind'
nishadt	'I asked'
gult	'I said'
lbist	'I ware'
jard	'cloak'
jild	'skin'
milt	'I bent over'

Despite the fact that Libyan learners have the sequence of CC in their L1, we will see that they still use epenthesis in various positions to break up CC clusters in English. Thus I can assume that they apply the rule of standard Arabic, as CC in onset is not permitted in MSA. I have shown possible initial consonant clusters in LA. These clusters can shape the phonological competence of learners, especially in perception. Therefore, learners have the choice of applying LA or MSA when acquiring English syllable structure.

I also show possible final consonant clusters in LA. These clusters can shape the phonological competence of learners, especially in the perception. Learners have the choice of producing them as part of their inventory capabilities. Despite the fact that LA allows CC in the coda, I expect that Arabic learners of English still use epenthesis. This

leads to the conclusion that there is no transfer of L1 rules but there is a developmental stage in learning CC clusters of English. See Appendix (H) Table (1&2).

I will try to find out the effect of MSA and LA in the production and perception of English clusters. My analysis will lead to the conclusion that vowel reduction is a feature in LA while epenthesis is related to MSA. I note that for initial clusters in LA, CCVC syllables become CVCVC or CVCVCV as in Ktab > katab or kataba. For final clusters CVCC occurs in clusters as:

(6)

	gloss
/bs/ as in *labas*	'wear'
/bn/ as in *laban*	'milk'
/ms/ as in *lamas*	'touch'

3.2.7.2 Syllable structure in English

English has the following syllables in its syllable inventory:

(7)

A-Initially, English permits the following sequences:

1)	V-	as in *o*range, *a*pple.
2)	CV-	as in *ge*nre, *pu*tting.
3)	CCV-	as in *tru*ck, *sto*p.
4)	CCCV-	as in *stra*w, *spri*ng.

B-Finally, English permits the following sequences:

1)	–V	as in hurr*y*, ver*y*.
2)	–VC	as in dr*op*, br*ead*.
3)	–VCC	as in m*end*, b*ox*.
4)	–VCCC	as in am*ongst*, ex*empt*.
5)	–VCCCC.	as in pr*ompts*, sc*ulpts*.

Two consonant clusters in English:

This type of cluster appears in initial, medial and final position:

(8)

Initial:	medial	final
*Pl*ay	ha*lt*ed	he*lp*
*Cl*ose	hanker	go*ld*
*Pr*y	si*nk*ing	fi*lm*.

Three consonant clusters:

Initial	final
*spl*it	hi*nts*
*str*eet	produ*cts*
*spl*ash	hi*nts*

In initial three consonant clusters /s/, the voiceless alveolar fricative, is the essential first element of CCC clusters; the second is a fortis stop; the third element must be one of /l, r, j, w/. Final clusters of CCCC occur only rarely as a result of the suffixation of a /t/ or /s/ to the first three consonants as in 'prompts' 'sixths' 'sculpts' 'instincts'. In English it is possible to have a syllable without an onset.

There are some specific rules in English: i. nasal and lateral consonants can form syllables on their own as in the final syllable in 'bottle'; ii. In Arabic vowels retain more or less the same quality whether they are stressed or not, whereas in English an unstressed vowel is reduced to schwa (Gimson 1980).

3.2.7.3 Arabic and English syllable structure

In regard to consonant clusters in a syllable, MSA has no sequences of more than two consonants in syllable structure whereas English has as many as four consonants in a sequence. LA may have two consonant clusters in onset, which is not found in MSA. An onset is obligatory in Arabic, but not in English. I note that learners break clusters of English CC and CCC in both the onset and coda. Thus we need an analysis to show whether learners apply L1 varieties of MSA or LA.

The following are consonant sequences that may cause problems to Arabic learners of English. I expect learners will have difficulties in perception and production

depending on Arabic varieties in addition to the amount of input. In other words the input will be more effective in changing perception and production if L1 varieties agree with the TL sequence.

Based on Fikkert (1994) and on an analysis of clusters in English and Arabic by Nasr (1963), I tried to apply the following clusters in testing perception and production in second language acquisition. These clusters were tested in the case of Libyan learners of English. MSA does not allow the combination of CC clusters in the onset whereas LA does. In production studies, I will try to find out the role of L1 in shaping the phonological competence of learners and the developmental stages in learning clusters. In testing perception, I used epenthesis to break clusters in various positions whereas in testing production I analysed the correct use of clusters by learners. I selected the following:

(8a)

For Initial cc clusters:

Plosive-glide clusters. /Tw/ /dw/ /Twelve/ /dwell/.

Plosive-liquid clusters. /Pl/ /pr/ /gl/ /Play/ /pray/ /glass/.

Fricative-liquid clusters. /fl/ /sl/ /Fly/ /slow/.

Fricative-glide clusters. /Few/ /thew/ /sue/.

Fricative-nasal clusters./sn/ snow /sm/ /small/.

/s/ plosive clusters./sp/ spark /sk/ /sky/.

/s/ fricative clusters. /sf/ /sphere/.

Final cc clusters:

Stop-stop /pt/ /kt/ /except/ /fact/.

Plosive-fricative clusters. /ps/ /ks/ /helps/ /six/.

Fricative-plosive clusters. /ft/ /st/ /left/ /most/

Fricative-fricative clusters./fs/ laughs/ /th-s/ /eighths/

Liquid-plosive clusters. /lp/ /lb/ /ld/ /help/ / bulb/

Liquid-nasal clusters./lm/ /elm/

Liquid-fricative clusters. /lf/ /lv/ /self/ /twelve/

Liquid-affricate clusters. /filch/ /bulge/

The voiced and voiceless features were also taken into consideration. The sequence of plosive clusters, affricate and fricatives as voiced and voiceless are also tested. See Appendix H for more details on the testing instrument.

3.2.8 Word stress

2.2.8.1 Word stress in MSA Arabic

Arabic is classified under the category of quantity sensitive languages. In this category, a heavy syllable in a particular position in a word will attract stress, and if there is no heavy syllable, a light syllable will get stressed. In words with a single heavy syllable, this syllable attracts stress. We consider the following examples, where a ' preceding a syllable indicates that it is stressed:

(9)

ba:'rak	'he blessed'
ma:'ktab	'office'
sana'taan	'two years'
yas'iiru	'he walks'

If the word has two or more CV patterns/ the first syllable is stressed as in:

(10)

'kataba	'he wrote'
'darasa	'he studied'
'rama	'he threw'

If a word consisting of more than three syllables and the first two have the pattern CVC, the second syllable attracts stress. In a word consisting of CVC followed by light syllables, the first syllable is stressed as in:

(11)

'mistra	'ruler'
'muntada	'assembly'

must'ashfa 'hospital'

Mousa (1994) states that syllable weight has been regarded as a very important factor in determining stress placement in different languages. Arabic behaves in the same way Latin does. He supports his claim by the following examples which represent forms of the Latin verb meaning to 'take'. We can notice that in c below primary stress falls on the penultimate syllable and it is heavy. In a, and b stress falls on the antepenultimate as it is light.

(12)

a	ka'pite	2 pl. imperative active
	ka'pitis	2 pl. present active
	kapi'mini:	2 pl. imperative passive
b	ka'pe	2 sg imperative active
	ke':pi:	1 sg perfect active
c	ke:'pisti	2 sg perfect active
	kapiu'ntur	3 pl present passive
	kapie':bant	3 pl imperfect active
	kapie':mus	1 pl future active.

According to Arabic phonologists, there are three scales for word stress in Arabic: *the first* scale is catogerized as /fa'il/ and in any word which has this pattern, stress falls on the first syllable as in sa'ma and ka'tab. *The second* scale is /mustaf 'il/ and any word which has this pattern, must have its stress in the second syllable as in musta'kbil and musta'fhim. *The third scale* is / maf'uul/ , and any word which has this pattern, must have its stress on the syllable that coincidence with /uu/ as in mahbuub and madruub.

According to Al-Ani (1970), stress is predictable in Arabic and therefore is not phonemic. The three levels that have been distinguished are: primary ['] , secondary [`] , and weak—unmarked. Every word has an inherently stressable syllable. This syllable receives the primary stress. Its location and distribution is affected by the number and types of syllables contained in the word-syllable sequences. A monosyllabic word in

isolation receives primary stress. Disyllabic and polysyllabic words may receive secondary and weak stresses in addition to the primary stress.

The rules that govern the lexical stress in MSA, with more explanation examples, are as follows:

I- When a word is made up of a string of the CV type syllables, the first syllable receives primary stress and the remaining syllables receive weak stresses.

(13)

kátaba	CV`-CV-CV	'he wrote'
dárasa	CV`-CV-CV	'he studied'

II-When a word contains a heavy syllable, the heavy syllable receives primary stress and the rest of the syllables go unmarked receiving weak stresses.

(14)

káatib	CV`V-CVC	'writer'
muállimhu	CV-CV`C-CV-CVC-CV	'his teacher'

III-When a word contains two heavy syllables or more, the heavy syllable nearest to the end of the word (the very last syllable does not count) receives the primary stress and, in most cases, the one closest to the beginning receives the secondary stress.

(15)

ra?iisuhúnna	CV-CV`V-CV-CV`C-CV	'their chief'(fem.pl.)
mustáwda?áatuhum	CVC-CV`C-CV-CV`V-CV-CVC	'their deposits' (masc.pl)

3.2.8.1.1 Word stress in Libyan Arabic

LA has a syllable structure that accepts the heavy/light dichotomy, where heavy syllables attract stress. Thus LA stress location must be stated with reference to the syllable weight distinction. Despite the fact that there are not enough studies with data, the following shows stress rules in LA.

(16)

a. Stress is on the final superheavy syllable, in CVCC, CV:C, and CV:CC.

manaadiil 'handkerchiefs'

ba:be`n	'two doors'
dara`st	'I studied'
dukka`:n	'shop'
mo:lade`:n	'two feasts'

b.Otherwise stress falls on the penultimate heavy syllable, in CVC, CV:

ba:`rak	'he blessed'
ma`ktab	'office'
mo:la`dna	'our feast'
bakari`tna	'our cow'
maka:ti`bna	'our offices'
ka`atib	'writer'

c. In all other cases, stress falls on the antepenultimate syllable, whatever its weight.

ka`tab	'he wrote'
ma`lik	'king'
da`ras	'he studied'

According to Abumdas (1985) the relationship between the syllable and stress is strong. In the case of LA, it is more convenient to divide word patterns into stress units instead of syllables. According to this method LA stress has three rules which must be tested for applicability in a fixed sequence. The second rule, for example, must not be applied unless the first one cannot be used.

Any word of the pattern CVCVC will be stressed on the ultimate syllable. In all North African Arabic to the west of mid-Libya, the stress placement of the pattern CVCVC is on the ultimate syllable where LA (west of mid Libya) is included. Many eastern Arabic dialects, on the other hand, put the stress of this pattern on the penultimate syllable. The stress placement on the pattern CVCVC is a very clear marker of the distinction between Eastern Arabic and Western Arabic. This distinction indicates that LA and all Magrib dialects of Arabic apply a stress shift rule. For example: ša´rib he drank > šari´b.

We can further note that although syllable structure and stress placement have strong interrelationship, vowel deletion affects the structure of syllables but does not affect stress placement in LA. Stress shift rule applies with or without the existence of vowel deletion.

The second rule is that stress falls on the closest long syllable (CVV or CVC) to the end of the word.

(17)

qa`lbi	'my heart'
niša`dni	'he asked me'

Like vowel deletion, vowel insertion does not affect stress placement in LA, as ya'lam 'he knows' and na´xalah 'palm tree'. It is logical because stress affects vowel insertion as in the case of initial consonant cluster where vowel prothesis applies only in stress environment.

The third rule is that where the first two rules do not apply, stress is placed on the first vowel in the word. It is noted that LA does not have a pattern with three short open syllables in a row. A word without a long syllable consists either of two syllables, one open and the other closed, or three syllables with the last one closed.

(18)

du`rubah	'he hit him'
ši`bikah	'net'

The fourth point is the exception to these three rules, as it shows that the stress on the pattern CVCVC is unpredictable, sometimes appearing in the shape of CV´CVC where the first vowel is stressed as in na´har 'killing camels'. In other times, the second vowel is stressed, as in ba<u>h</u>a´r 'sea'.

3.2.8.2 Word stress in English

In English, heavy syllables attract stress. In a word such as 'Canada' stress falls on the initial syllable because all syllables are light; in a word such as 'agenda' stress is attracted to the heavy syllable. However stress falls in different syllable positions depending on the category of word. Whereas nouns tend to attract stress to the penult (if heavy) or to the antepenult (if the penult is light), unsuffixed adjectives and verbs normally display final stress.

(19)

Nouns	
Light	heavy
ca*mera* ci*nema* di*scipline*	*a*gen*da* *di*plo*ma* *po*ta*to*
Verbs	
*dis*play *ins*pire *di*gest	
adjectives	
*se*cure *di*vine *ab*surd	

Archibald (1992) states that in order to consider how non-native speakers of English come to acquire English stress patterns, we must consider some of the relevant characteristics of English stress. Hayes (1980) states that in English, there is a principle of Consonant Extrametricality where every word-final consonant is extrametrical. This shows the generalization that stress is assigned to the final syllable of a word if it contains a branching rime, otherwise stress is assigned to the penult. Furthermore, this type of extrametricality works for stress assignment in verbs but is problematic in nouns. For noun extrametricality the final rime of a noun is ignored in stress assignment.

Broselow (1988) discussed a number of cases in which particular analysis of the phonological system of a language provide an account of errors in the production or perception of a foreign language. Each case involves a conflict between principle of prosodic organization in the native and the target language. This sort of evidence is interesting to the linguist in that it provides a source of evidence for testing hypotheses which might not be available in the native language itself. As such, it is directly relevant to the discovery of the principles of UG.

According to Archibald (1993), the learner has certain universal principles (which are innate and hence not affected by the environment) and parameters (which need to be switched to a particular position depending on the language of the environment) guiding language acquisition. The parameter does not get set until the learner is exposed to linguistic environment. The different parameter settings capture certain things about the structure of the different languages.

From the perspective of a principles and parameters framework, the learners must determine which type of language they are learning. Universal grammar contains the hypothesis space by delineating the language type. Examples in (20) below illustrate some of the metrical parameters proposed by Dresher and Kaye (1990) as being part of UG. They are designed to determine metrical structure construction and labeling.

(20)

Some universal metrical parameters

P1: The word-tree is strong on the [left/right].
P2: Feet are [Binary/Unbounded].
P3: Feet are built from the [Left/Right].
P4: Feet are strong on the [Left/Right].
P5: Feet are quantity-sensitive (QS) [Yes/No].
P6: Feet are QS to the [Rime/Nucleus].
P8A: There is an extrametrical syllable [No/Yes].
P8: It is extrametrical on the [Left/Right].

3.2.8.3 Statement of the problem

L2 learners encountered many problems in the acquisition of L2 phonology. However the acquisition of syllable structure of TL requires the mastery of phonemes, clusters and stress. Libyan learners acquiring syllable structure of English need to reset parameters of the L1 syllable to the L2, in terms of the problem in the acquisition/learning of phonemes that are not part of learners' L1 phonology. Mainly they are consonants and vowels. Misperception and production of phonemes will affect clusters of syllable structure.

For consonants, Libyan learners tend to pronounce English [h] rather harshly.

Learners commonly over pronounce the post-vocalic [r] in words such as 'car park'.

(21)

They perceive and produce /p/ as an allophone of /b/
And they perceive and produce /v/ as an allophone of /f/.
Further they perceive and produce /θ/ as an allophone of /t/.

English has many more vowels than Arabic. As a result, learners will tend to use their relatively small number of vowels to cover the larger English vowel system. Short vowels in Libyan Arabic have very little significance: they are almost allophonic. They are not even written in the script. On the other hand, long vowels give meaning. While virtually all vowels may cause problems the most confused are:

(22)

The contrast / ɪ / as in bit and / ɛ / as in bet.
The contrast / ɪ / as in ship and /i:/ as in sheep.
The contrast / æ / as on cat and /ʌ / as in cut.
The contrast / ɔ: / as in port and / ʊ /as in put.
The contrast / a:/ as in farm and / ɛ: / as in firm.

Learners will use the strategy of vowel reduction or vowel lengthening. Although the Arabic vowel system has diphthongs, these rarely seem to cause problems. The use of glottal stops before initial vowels is a common feature of Arabic.

For the acquisition of syllable structure, the main difficulty for Libyan learners of English is three element clusters in a syllable initially and finally, as in *street* and *against*. However I also expect learners to have some difficulty with CC clusters due to developmental processes.

Broselow (1987) indicates that our inability to predict the occurrence and nature of many errors may well stem from inadequacies in our understanding of native speaker competence rather than from the failure of the CA hypothesis itself. She states that there are three types of transfer of native language syllable structures to the target language: (1) word juncture errors resulting from application of native language syllabification rules to target language strings, (2) ability to produce the sounds of target language in a particular

position in a syllable dependent on whether those sounds occur in that position in syllables of the native language, (3) application of vowel insertion to bring target language syllables into line with native language restrictions on syllable structure.

The discussion of errors made by native speakers of two dialects of Arabic: Iraqi and Egyptian Arabic. Her methods revealed interesting differences in the treatment of initial consonant clusters by members of the two dialect groups. Speakers of Egyptian Arabic tend to insert an [i] between the first and second consonants of an initial two consonant cluster as in [filoor] and [bilastik]. On the other hand, Iraqi speakers tend to insert [i] before the initial cluster as in [ifloor] and [ibleen]. Thus Iraqi speakers may have less difficulty in producing medial clusters than Egyptian speakers. This may be attributed to positive transfer: while Egyptian Arabic words may not begin with consonant clusters, Iraqi words can do so.

Tarone (1980) suggested that speakers whose native languages have some of the same, relatively complex syllable structures as those appearing in the target language, and who still attempt to break those structures into simpler open syllables as they speak the interlanguage, would provide clear evidence that some process other than language transfer were operating. In such cases, one might claim that a universal process of simplification towards an open or CV syllable was in evidence.

I argue that in perception and production of English clusters, MSA is still in operation alongside LA for Libyan learners of English. This could be attributed to the fact that learners have insufficient input in the TL setting. Furthermore learners might still be making use of their L1 phonology. As explained, MSA allows two consonant cluster in the onset of a syllable. In three consonant clusters, both Iraqi and Egyptian Arabic have rules inserting a vowel into medial three consonant clusters. However the rules of the two dialects differ in one respect. In Iraqi, the vowel is inserted after the first of three consonants as CiCC, while in Egyptian Arabic, the vowel is inserted after the second of three consonants as CCiC. Broselow's analysis of epenthesis depends on the notion that epenthesis is actually a rule bringing underlying forms into conformity with restrictions on possible surface structures. If a form contains consonants which cannot be analyzed as a grouping into sequences of acceptable syllables, epenthesis applies to create permitted syllables.

i.The speaker of Libyan Arabic has initial CC as we have seen in 3.2.7.1.1 above, in practice he/she has very little difficulty with English initial CC.
ii.CCC initially is usually reproduced as CVCC and as CCVC finally, and medially as CVCC or CCVC. Therefore learners insert a vowel to break the sequence of clusters:

(23)

'ispring' or 'sipring'
'waspis' or 'wasips'

iii.CCCC finally is usually reproduced as CCVCC, and finally as CCVCC or more often CCCVC. 'prompts' as 'prompits' and 'sculpts' as 'sculpits'.
Thus learners use epenthesis as a strategy in breaking consonant sequences. They bring their native language syllabification principles into the target language. But there are other cases where learners show developmental stages.

Arabic is a stress-timed language, and word stress in particular is predictable and regular. Arabic speakers, therefore, have problems grasping the unpredictable nature of English word stress.

The details of stress assignment of English and Arabic are different. In both languages stress is assigned as a function of syllable weight. However, in English when a syllable is stressed in a word, vowels in neighbouring syllables in the same lexical item tend to be reduced from a full vowel to a schwa. But in Arabic when stress changes its position, vowels are not reduced.

3.2.8.4 Predictions

I expect learners to have problems in perception and production in acquiring TL. But if the input is sufficient learners will gain final attainment in L2 phonology. However, perception and production of TL will be effected by L1 Arabic varieties at early stages. During these stages learners had low exposure to English in TL settings. As I noted earlier phonemes of English and Arabic are different. In addition, phonemes differ between Arabic varieties, and this will effect the degree of perception and production of English. Furthermore, perception and production will be guided by stages

of learning. At some stages, perception will be better than production, while in other stages production will be ahead of perception. This assumption cannot be proved without testing.

Perception and production of syllables in English will be affected by Arabic structure; that is the knowledge of L1. However, the amount of input will guide learners towards TL structure. Thus their perception and production will be nativelike. In the perception and production of stress, learners will use their L1 parameters, but as they are exposed to high input they will apply TL parameters in their production. Furthermore their perception will be guided by TL parameters.

Thus for syllable structure I concentrate on clusters in onset and coda, because Arabic clusters differ depending on the dialect. In my study I tried to create the testing instrument based on clusters that are in MSA, LA and English to find out the changes in the perception and production of my learners. For stress I tested word stress in isolation and stress in a sentence. In what follows, I will try to trace previous studies of Arabic speakers' acquisition of the English syllable and stress.

Chapter Four

Arabic-speakers' acquisition of English syllable structure and stress

4.1 Introduction

Previous remarks are valuable for the study of the perception and production of the target language, English. In perception, learners hear the input through the standard as well as their own language variety. This mixture of first language systems can be predicted to affect their target language. That is, L1 phonological structure is also important in terms of perception. We thus predict that the production of the target language is controlled by the standard, the dialect variety, and the target language.

In what follows, I will outline the studies of segments, syllable and stress in L2 phonology. Then I will find out Libyan learners strategy in acquiring English clusters of CCC. After which the previous studies of Arabic learners of English phonology will be given. Then I will discuss the input and the teaching of English in Libya. Furthermore I will show the role played by the standard and the dialect of Arabic and teaching English pronunciation. I will also mention the acquisition of metrical parameters by Arabic speakers and incorrect perception and production.

4.2. Segments, syllable and stress in L2 phonology

Research on the acquisition of L2 phonology was primarily concerned with the acquisition of segments. The largest body of research relates to VOT which distinguishes between initial stop consonants in many languages. Whereas previous studies of the acquisition of the segments tended to view them in isolation, an account of L2 phonology which takes the syllables into account regards the realization of a segment as determined by its position within the syllable (Young-Scholten 1993).

The syllable is the unit of timing. The most agreed upon view of the syllable is that it is composed of an onset and a rhyme. The rhyme is composed of a nucleus and an optional coda. All languages have CV syllables but they may or may not have syllables without onsets or syllables with codas. L2 learners normally modify syllable structures to fit their L1 syllable structures (see figure 4.1 below).

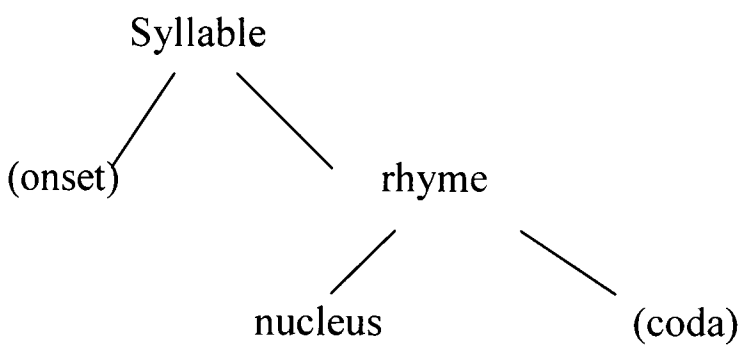

Figure 4.1

There seemed to be two strategies followed by L2 learners within syllable structure. They are epenthesis and consonant deletion. Another issue has to do with markedness and whether it is possible to acquire more marked syllable structures when the L1 allows a more restricted set of structures.

Oller (1974) claimed that epenthesis in syllable-final position typifies SLA, and that consonant deletion is characteristic of child first language acquisition. Tarone (1987) examined English syllable structure of Cantonese, Portuguese, and Korean L1 speakers and found out that the Cantonese and Korean speakers favoured consonant deletion, whereas Portuguese adults preferred to use vowel epenthesis. Greenberg (1983) studied Greek, Turkish, and Japanese learners of English. He reported that learners tended to use vowel epenthesis reflecting a tendency for a universally preferred CV type.

Broselow (1987) showed evidence in support of transfer effects of Egyptian Arabic syllable structure on the L2 acquisition of English. Broselow and Finer (1991) studied native speakers of Korean and Japanese learning English, and found effects of markedness and transfer. They argue that Korean and Japanese reach a parameter setting between the L1 and the L2 values regarding the Minimal Sonority Distance Parameter. Subjects were tested on stop+j and stop +r clusters and it was found that learners could produce Cj and /pr/ clusters with the same level of correct productions. Since neither of the two languages has /pr/ clusters, but they have Cj, this showed evidence that they are resetting the parameter.

Ekman and Iverson (1993) argue that typological markedness is a much better predictor than the minimal sonority distance for the interlanguage patterns of syllable structure. Thus they explained results of Broselow and Finer in another approach. Furthermore, they showed that obstruent-glide onsets are more marked than obstruent-liquid onsets.

Broselow and Park (1995) analysed epenthesis in the English of Korean speakers. They found that epenthesis tends to occur after a syllable with a long vowel, while it is absent after a syllable containing a short vowel. They further claim that learners' interlanguage grammar contains a stage in which the setting of the L1 is operative for analysis of the target language forms, and the setting of L2 is operative in the production of these forms.

Mairs (1989) found that all the errors of Spanish learners of English could be attributed to the rules of the L2 target language stress system. These errors were as a result of transfer of the syllable structure of the L1. Archibald (1995a,b) adopted a parametric model for stress assignment and investigated whether L2 learners are able to reset parameters in a second language. He concludes that learners are able to reset some metrical parameters within UG principles. Pater (1997) studied French learners of English and suggested that learners adopt a value which is not correct in both L1 and L2. This supports the idea that learners are mis-setting a parameter. Furthermore, one can argue that parameters can be reset even in an incorrect value.

Subconsciously speakers of a second language attempt to bring L2 forms into conformity with their L1. They use epenthesis, deletion, or metathesis. Arabic learners of

English use epenthesis more often than deletion. This is a result of transfer of native language rules.

Studies of second language acquisition have indicated that epenthesis is a major strategy used by L2 learners to reduce consonant clusters and to eliminate word-final consonants. Learners attempt to insert an epenthetic vowel either before the cluster or inside the cluster depending on their dialect. Thus speakers of different dialects of Arabic follow different strategies in the treatment of initial consonant clusters (see Broselow 1987). Egyptian learners of English tend to insert an [i] between the first and second consonants. By contrast, speakers of Iraqi Arabic tend to insert [i] before the initial cluster. This is expressed in the following examples:

(24)

Egyptian.	gloss	Iraqi	gloss
[filoor]	'floor'	[ifloor]	'floor'
[bilastik]	'plastic'	[iblane]	'plane'
[tiransilet]	'translate'	[isnow]	'snow'
[silayed]	'slide'	[istadi]	'study'
[Fired]	'Fred'	[ifred]	'Fred'

(Broselow 1987)

Apparently Iraqi speakers have less difficulty in producing initial clusters than Egyptian speakers. This may clearly be attributed to positive transfer: while Egyptian Arabic words may begin with only one consonant, Iraqi words may begin with consonant clusters. However, errors of both Egyptian and Iraqi learners of English result from the transfer of a productive phonology rule of the native language. We find also the effect of the standard variety and the dialect of the language. As I explained earlier, MSA does not have initial clusters whereas dialects of Arabic do. This will have a major effect on learners' perception and production of TL, specifically when learners are exposed to the amount of input in TL settings. Therefore Arabic learners will perceive English syllable with epenthesis in the onset and coda. They also produce English syllables using epenthesis as a remarkable strategy. I predict that Arabic learners will delete the vowel as

they are exposed to English in TL settings in their production of English syllable. Their perception will be nativelike as they spent time exposed to English accentuation system. In stress, learners will show mastery over word stress and sentence stress depending on the amount of exposure to TL. It is also possible that learners will have transfer errors and developmental errors depend in the amount of exposure to TL accentuation system.

4.3 Libyan learners' strategy in CCC

I will try to explain my informants' strategy in their perception and production of target language referring to what is mentioned earlier. Though, Libyan learners of English follow different strategies in breaking up sequences of CCC clusters based on their native language. In transferring rules of LA as other speakers of Arabic, they pronounce them as either CVCC or CCVC. Thus they simplify CCC to CC clusters following their native language rules. (See Al-Ageli 1996). This could be explained as follows:

(25)

LA	MSA	
ja*nbk*um	janb*u*.kum	'your side'
ba*nkn*a	bank*u*.naa	'our bank'
ba*rdn*a	bard*u*.naa	'our cold'
difa*ntt*a	dafant*u*.ha	'I buried it'

In the above examples in (25), learners apply different strategies in breaking up CCC sequences. The examples show that learners break clusters in LA and not in MSA structure. Furthermore they apply MSA and not LA syllable structure in acquiring English syllables. In learning MSA, Libyan learners break up clusters with epenthesis showing that they do not transfer rules of their own dialect; rather they develop a new strategy in learning. This strategy is brought by learners to the task of acquisition. Therefore one can conclude that learners transfer L1 parameters, but they do not produce sequences of clusters in English. Thus we can not yet judge whether learners transfer

rules of MSA into English or develop a new strategy. This fact will be revealed by results of the study later.

L1 plays a major role in the perception and production of TL syllable and stress. Therefore we expect Arabic, the language of my informants, to play a significant part in shaping the phonological competence of learners at early stages. This role will be less significant as learners are exposed to English accentuation system. Furthermore learners will gain the accentuation of English as they have high amount of input. I also expect learners to have access to the parameters of English language based on the amount of input. However Arabic learners of English make errors for various reasons.

According to Broselow (1988) the first error involves the breaking of consonants clusters in English by native speakers of Arabic. They transform English strings into pronounceable Arabic syllables. Arabic speakers attempting to speak English are often faced with words containing syllables with more consonants than would be permitted in Arabic. The second error in the speech of Arabic learners of English shows another kind of prosodic mismatch between the two languages. Arabic learners typically alter the shape of the word either by producing a geminate consonant in the final position or by lengthening the vowel. These errors can be accounted for as a result of a mismatch between constraints on the prosodic structure of words in English and Arabic.

English is not as restrictive as Arabic in its definition of possible words, since English does, and Arabic does not allow CVC words with a rhyme consisting of a short vowel followed by a single consonant. Arabic mispronunciation involves increasing the syllabic weight of these kinds of words, and thus altering the shape of English words to bring them into conformity with stricter Arabic constraints on prosodic structure.

Perception error of L2 strings may also be accounted for by differences in the prosodic structure of English and Arabic. Two other constraints in relation to word juncture evolve: the first is a constraint on cross-word syllabification, and the second is a constraint on metrical structure of words. They involve the incorrect segmentation of strings into words. These errors are more or less universal among English learners of Arabic and occur even when the learner is confronted with phrases containing familiar words and when syntactic and pragmatic cues led to the expectation of hearing these familiar words.

It has been long recognized that in English various phonetic cues such as aspiration and consonant duration signal juncture differences, such as the difference between 'a tease' and 'at ease'. The allophonic differences in consonants that signal differences in juncture are conditioned by the position of a consonant in a syllable.

In English both words and syllables may begin with clusters, but a consonant cannot be moved leftward across a word boundary to join the final syllable of a preceding word. Some Arabic dialects, such as Egyptian Arabic, allow this kind of re-syllabification when a word begins with two consonants. If we assume that the phonetic cues indicating whether a consonant is syllable-initial or syllable-final are roughly equivalent in English and Arabic, then what is happening here is that the English speaker hears the syllable structure of an Arabic phrase correctly, but interprets these structures in terms of the constraints on the relationship between syllable boundaries and word boundaries which obtain in English. This sort of evidence provides additional support for the analyses of syllabification rules in both English and Arabic, evidence of the sort which is not available if one looks only at one or the other language.

According to Broselow, metrical organization also plays a role in learner's errors. English speakers make use of the stress patterns of a string in making segmentation decisions. We will mention one other sort of phonetic cue which may have different interpretations in different languages and which may therefore lead to errors in the perception of a foreign language. It involves the segmentation of strings into words.

It seems clear that English speakers make use of the stress pattern of a string in making segmentation decisions. They prefer segmentation in which stressed syllables are word–initial. So a monosyllabic content word is generally longer than any syllable of a multi-syllabic word. They are apparently able to make use of this length difference to segment into words in the absence of any other cues to word membership.

Furthermore it was the length of syllables rather than their pitch or amplitude which subjects used in determining which syllable replaced single words: a syllable with a longer than normal vocalic nucleus was identified as a monosyllabic word. This effect is attributable to a rule of English that lengthens monosyllabic words. This rule may be thought of as the English counterpart of the Arabic constraint on minimal words; but

while the Arabic constraint enforces a particular phonemic structure on lexical entries of monosyllabic words, the English rule represents simply a phonetic tendency.

As Arabic speakers interpret English tense vowels /i/ or /u/ as long, English speakers hear a long /ii/ or /uu/ in Arabic as equivalent to the normal English tense /i/ or /u/, rather than as an overly long vowel. We would expect an English speaker to be less likely to hear a long /ii/ or long /uu/ in Arabic as a lengthened vowel than to hear a long /aa/ as a lengthened one. Since vowel lengthening is a cue to the presence of a monosyllabic word for English speakers, we would expect phrases to containing final syllables with long /aa/ to be segmented more often than phrases with final syllables containing long /ii/, /uu/ or short vowel. Thus English listeners appeared to identify phonemic vowel length in the low vowels with the lengthening caused by Monosyllabic Word Elongation.

Each case involves a conflict between principles of prosodic organization in the native and target language. This sort of evidence is interesting to linguists in that it provides a source of evidence for testing hypotheses which might not be available in the native language itself. As such, it is directly relevant to the discovery of principles of Universal Grammar.

Young-Scholten (1994) points out that recent work on the nature of the input required to accomplish the settings of parameters in syntax offers one possible explanation for lack of nativelike attainment in L2 phonology. Young-Scholten (1995) mentions that much less attention has been devoted to the question of eventual attainment since it seems quite obvious that the ultimate outcome for the great majority of post-puberty learners is not native or even nativelike competence in the L2 phonology. She suggests that a more critical examination of L2 phonology must be undertaken before we can address the issue of access to the phonological principles and parameters of Universal Grammar.

She argues that we are not currently prepared to answer questions regarding ultimate attainment and access to UG because variables relating to the input the learner has received are generally not controlled for when data are collected. She claims that while much of the L2 phonology research carried out up to now has indeed provided valuable insights into the factors which influence interlanguage phonology, the studies

involved are problematic in terms of addressing the issue of ultimate attainment and access to UG.

Thus one can conclude that language learning and teaching at the phonological level includes many issues in TL settings. Furthermore, correct perception and production can be linked to the amount of input learners are exposed to, or to the training and instruction in L1 and L2 setting. Therefore we concentrated on the perception and production of learners with reference to their Arabic varieties and English in TL settings. The perception will reveal the phonological competence of learners as they come to TL in early stages of learning. On the other hand, production will show how perception changed over time in the case of learners as they have high amount of input in TL settings. However previous studies of Arabic learners of English do not reveal the mechanism at work in perception and production of learners once they are in TL settings. I will provide some works that approached the subject and dealt with Arabic learners of English.

4.4. Previous studies of Arabic learners of English phonology

There are not many studies that address the phonology of Arabic learners after exposure to English in a target language (TL) setting, especially at the level of syllable structure and stress. However some studies show interesting findings related to the phonology of Arabic learners as they exposed to English in L1 setting at the level of segments, syllable structure and stress. Furthermore one can notice the effect of L1 varieties in shaping the phonological competence of the learner.

Although there is some research that dealt with the English phonology of the native speakers of Arabic, it has not provided us with clear-cut evidence about the upper process. In other words, most research has dealt with sounds in isolation. That was at the level of consonants or vowels, where no attempts have been made on the prosodic structures of L2 in the case of Arabic language.

Milton (1985) studied the development of foreign consonant pronunciation and related perceptual and imitative skills among native Arabic speakers learning English as a foreign language. In his study, he mentioned that current methods of teaching second language pronunciation have failed to develop a high level of communicative ability in

the absence of the target language environment. There is also no satisfactory theory of pronunciation learning.

As stated above, the aim of this study was firstly to contrast Libyan Arabic and English consonant phonology in order to identify the English consonant phonemes and allophones to be acquired. Secondly it was to examine the English second language speech of Libyan learners, and thirdly to use this information to examine aspects of the process of learning. Fourthly it was to use the information and insights gathered in the study to try to improve the techniques and materials used to teach English pronunciation especially in Libya.

The subjects were native speakers of the Sebha dialect of Arabic. They were taught English as their sole foreign language. They fell into one of three categories: beginners, who were students in one of the Sebha Schools. They had received between 6-18 months English teaching from native language speakers; advanced, who were all graduates of English from Sebha University and had had many years' tuition of English from native speakers and had spent a period of months or even years in England and were fluent speakers with good pronunciation; and intermediate who were students with one year of English. These subjects were put based on their entry test into a particular English course as having a standard of pronunciation and fluency in oral communication better than that of the beginners but still far from advanced or perfect.

Milton used (i) a usage test where each subject was shown a serious of four pictures telling a story, and the storyline and characters were briefly explained with familiar names. When the subjects understood the story they were asked to retell it in their own words. (ii) A perception test where subjects were asked to distinguish the target sounds from other sounds. For example /p/ from /b, f, t/. For each discrimination test, a series of three syllables was heard twice. Two of the syllables were identical and the third differed by only a single phoneme or feature. The subject was asked to mark on the answer sheet which of the three phonemes was odd. The answer sheet also provided a fourth possible answer that all three syllables were identical, if the subject could not distinguish between the syllables. Each discrimination test was tested four times, twice with the target sounds by itself and twice with the target sound in a consonant cluster. In addition, this test included two control exercises. In the first, the subject was asked to

distinguish between two native language phonemes. In the second, all three syllables were identical. (iii) Imitation test: Subjects were asked to repeat a series of single syllables containing the target sounds after they heard them. Each target sound occurred in different syllables, twice with the sound occurring by itself and twice with the sound in a cluster. A control exercise was included where the subject was asked to repeat syllables containing consonants from his native language.

The perceptual abilities and production of new consonants showed some correlation at the level of the phonetic feature. It was also found that the relationship between imitation and production ability was rather better than for perception and production, although a direct causal link may not exist between imitative and production difficulty.

Furthermore it seemed that at the level of first and second language learning sequences, the Libyan learners of English in this study were following some natural order of learning. It was also shown that first language phonology forms the basis of second language phonology, but that pronunciation develops through a series of phonetic feature divisions. Thus learners developed their ability in stages to control the phonetic features of English.

In regard to segments and syllable structure learning, the results supported the idea that difficulty is the result of the presence of particular phonetic features. In all other respects, the learning of segments and the learning of syllables appeared very similar.

At the level of the learning model, it is suggested that first and second language learning appears to use similar strategies and to follow very similar sequences of development. On the basis of the available evidence, Milton suggests that an "in-built syllabus" or natural order theory of learning, which is mentalist, is the most satisfactory learning model for pronunciation learning. He has explained that in using natural order theory and knowing the order of learning it becomes possible to anticipate where error will occur in foreign language pronunciation, the nature of error that will occur and how the error will change and be overcome in course of learning.

Milton further recommended that to fit with natural order theory, teaching should be communicative, and the technique of using drills in pronunciation teaching is rejected

as a result. His findings are very interesting to second language phonological theory. Moreover he emphasizes the important role of natural order theory of learning.

For further research, he suggested that the research involved in this study should be extended to a larger population to confirm the results. Other learners of different second languages should be studied to demonstrate the existence of a sequence of second language pronunciation acquisition, and to assess the influence of the native language on the second language phonology then second language learners from different native language backgrounds should be studied.

For a complete picture of phonology learning, other aspects of the learning process should be examined especially "prosodic" learning, sounds tied to the lexis, and vowel, segments and supra-segmental learning; more extensive and intensive longitudinal studies of pronunciation learning are required to refine the sequences and hierarchies of learning outlined in this research.

It might be useful, as well, to investigate learning by sampling spontaneous speech to discover whether the methods used in this study produced artificial results in some way. He recommended that much more research is needed into the direct influence of individual teaching methods and techniques to try to find which best-promote pronunciation development.

Bottaga (1991) carried out cross-sectional studies on Arabic learners of English. His studies show that the development of second language phonology is almost the same as that of first language, and the acquisition order of the pronunciation learning sequence, for both first and second languages are very close. He concludes that the best way of learning pronunciation is through following the natural order of learning.

Salem (1991) studies the development of some English consonants in a longitudinal study of four Arabic-speaking adults and two Portuguese-speaking child learners of English as a second language. The study provides some information about the stages through which the learners in this study progress in acquiring English consonants. Its aim is to describe the learning process of English pronunciation in terms of phoneme and phonetic feature development in order to discover areas of difficulty and the manner with which this difficulty is tackled: to compare the consonant phonology of English with those of the Egyptian Arabic and Brazilian Portuguese, and to examine the English

second language spontaneous speech of learners and test error rates, the speed of improvement and sequence of mastery among the new foreign items. This will lead to an investigation of the process of learning in order to discover the following: i. Whether error rate, by itself, is a genuine guide to learning difficulty in pronunciation. ii. whether the sequence of learning discovered for second language acquisition is similar to the acquisition of the first language (described by Sander 1972, Crystal 1976, and Blache 1978). iii. Whether the second language sequence of learning discovered in this study are similar to each other and to the sequence of second language acquisition described by Milton (1985). iv. To discover which model of learning can best serve pronunciation learning. v. To decide whether pedagogical implications are possible for fresh information drawn from the study.

The numbers of subjects included were 6 learners. Four adults were from Egypt with Arabic as their mother tongue language, and two children from Brazil with Portuguese as their native language. All subjects were learning English in an English speech community and none of them spoke a foreign language other than English. The period during which the tests were carried out was 9 months for the Portuguese and 4 months for the Arabic. The testing instruments included some pictures from Byrne (1986) and Heaton (1987). Where subjects were asked to talk about them or to speak freely about any topic, at times the subjects were left alone and tape-recorded from another room nearby.

As results have shown, it has apparently emerged that not everything that has to be learned is equally difficult. Some phonemes and distinctive features cause much higher rates of error and are learnt later than others. It was also possible to demonstrate that in the process of learning pronunciation the learners show common development tendencies. It is possible to argue that there is some kind of general sequence in second language phonological development.

Learners seem to approach second language pronunciation in a systematic way. The results have revealed that a number of distinctive features never presented problems for the learners, and even at the starting point of learning, learners seem to make fundamental distinctions about the nature of second language sounds. Furthermore learners seem to be making some hypothesis about the new second language sounds.

This whole process can best be viewed in features development where successive feature distinctions are added to the proto-phonology in a manner similar to the first language development descriptions of Jakobson (1968) and Blache (1978). These findings have a number of implications. The result of this study seems to disagree with Brain's (1974) claim that phonetic features may not have psychological reality in the minds of the learners. They have revealed that analysis at the level of the phoneme may not be as useful and informative as analysis at the level of distinctive features for describing language development. Adaptation, variation in substitution and regression are very much features of phoneme learning. This would suggest that the work of Hassan (1977) and Mulford and Hecht (1980) and maybe others who assess pronunciation learning at the phoneme level may lack useful insight. The suggestion of Corder (1973) and Clark (1975) is that the processes and strategies of first and second language development are similar. It is noted that error rate is often seen as synonymous with learning difficulty but little evidence exists to support this idea. But it is not clear whether there is any connection between error rates and sequence of mastery.

The findings seem to be supporting Milton (1985)'s findings that the relationship between error rate and sequence of mastery at the level of phoneme is quite strong. The relationship obtained among the phonetic features is much clearer than with phonemes.

Salem (1991) has also found out that foreign language phonology is based on first language phonology but the whole process of learning pronunciation can best be viewed in feature development when successive feature distinctions are added to the learners, repertoire. He suggests that second language learners of his studies were following some natural order of learning, and that some possibly universal cognitive mechanisms are the basis of learner's organization of a target language. That is the second language system, which guides the acquisition process. He concludes that pronunciation learning appears to be much closer to natural order theory.

Salem has also recommended that other aspects of the learning process be investigated if a complete picture of phonology learning is to be obtained. Of these aspects which have not been researched are prosodic learning, sounds tied to lexis, and vowel segments and supra-segmental learning. Also the learner's ability to discriminate perceptually and to imitate new consonants needs to be investigated.

It could be concluded that error rate is a good guide to learning difficulty as indicated by sequence of learning, and the conclusions of Hassan (1977) in phonology and Tran-Thai chau (1975) and others in grammar learning will therefore be useful. The results are interesting and perhaps significant. However generalizations cannot be made from data and results obtained in a small case study. This kind of longitudinal research must therefore be extended in several directions before definitive conclusions can be drawn.

It is necessary to replicate this study on subjects with different backgrounds and, if possible, to extend the period of study to cover a longer span of development. The findings of such studies could have significant implications in the field of language learning and language teaching. More natural data can certainly reveal more about second language acquisition.

Mousa (1995) tries to investigate the interphonology of Saudi learners of English. His attempts are made to specify the development of phonological systems of learners throughout the different stages of learners' scholastic life. An attempt is made to account for the acquisition of certain English monophthongs and diphthongs that are missing in the Arabic vocalic system and which are thought to be problematic for native speakers of Arabic.

An acoustic analysis of the errors made by the learners pronouncing the English stops /p,t,k/ was carried out, and a correlation of the English /r/ was also discussed. His conclusion was based on the principle of parameters of UG. Mousa carried out a cross-sectional study. His subjects were aged between fourteen and eighteen years old, but all of them were male. They had been exposed to English language from three to nine years. That was four hours per a week at school in a non-target environment. His study highlights the necessity of a clear theoretical conception of the nature of the sound system being acquired. Furthermore Mousa has stated that the application of UG and parameters theory in the domain of phonological theory in general and in L2 in particular is a very recent issue.

Mousa (1995) explains the interphonological vowel space of Arabic learners, and states that many Arabic speaking learners of English have the most difficulty hearing and producing the mid-high front vowel /e/. Informants produced the high-front vowel /i/

instead at a frequency of occurrence ranging between 46% to 59% of the time. Concerning the perception of the same vowel, recognition test I has shown the error percentage to range between 8% and 18% and recognition test II between 33% and 35%.

For syllable structure, Mousa discusses the pronunciation of English words containing consonant clusters of bi-literal clusters and tri-literal clusters. The investigation of epenthesis and consonant reduction are two strategies followed by Arabic learners of English. Learners' performance in the case of final bi-literal clusters is the best. Initial bi-literal consonant clusters show a very low percentage of errors, compared to tri-literal clusters in all environments. Results show that both epenthesis and cluster reduction conspired to simplify final tri-literal cluster. Thus epenthesis is more frequent than cluster reduction. The insertion of glottal stop before initial vowels in English words was another strategy followed by Arabic learners. Though, all words beginning with a vowel were pronounced with a glottal stop. Gimson (1980) states that vowel initial words can optionally take a glottal stop in English, though the glottal plosive is not a significant sound in RP system.

The fact that learners had no difficulty in the pronunciation of final bi-literal clusters, could be attributed to the nature of L1 of learners. L1 allows such consonant clusters word finally, these clusters are part of learners' phonological competence. On the other hand the same sequences word initially showed no difficulty because L1 variety allows such clusters. Learners had the most difficulty in pronouncing three consonant clusters in the onset and coda. Broselow (1987).

Arabic learners of English phonology insert the glottal stop before the initial vowel in words as 'against' and 'exempt'. The first syllable in each of the words consists of a VC or a single V. These are not syllable structures in Arabic. Thus learners transfer rules of L1 to come up with an IL form of the syllable in L2.

Epenthesis is a common strategy used by Arabic learners of English to reduce consonant clusters (Tarone, 1980; Broselow, 1987). Therefore the deletion of the epenthetic vowel is the acquisition of TL consonant clusters. According to Broselow (1988) the insertion of an epenthetic vowel differs from one variety to another. In the case of Egyptian Arabic learners of English, learners place the vowel to the right of the consonant. On the other hand Iraqi Arabic learners of English place it to the left of this

consonant. Libyan learners place the vowel as Egyptian Arabic. The only exception is the pronunciation of words which contain the cluster s-stop as in [study]. Where learners insert the vowel before the fricative /s/.

It is clear from what is said above that the difficulty our learners encountered in the production of English clusters led them to the use of epenthesis. Furthermore the less epenthesis used by learners means that learners show a development in acquiring the TL.

A specific study in the case of Arab learners of English in placing incorrect stress was carried by Anani (1989) where learners tend to divide English words into syllables to make them coincide with the total syllable pattern typical of the underlying phonological structure of Arabic. The overall stress pattern of English words, in particular, generally conforms to the total stress pattern of Arabic, which is characterised by fixed word stress placement and more restricted syllable structure, in contrast with English where relatively unconstrained syllabication and free stress patterning exist.

The influence of L1 parameter values was apparent in the form of syllable structure transformations that were applied to the L2 syllable structures in order to make them conform with well-formed syllable structures in L1, and not to the universally unmarked CV syllable. The strategy used by learners for syllable simplification was that of vowel epenthesis and not consonant deletion. Thus one can notice that previous studies have not dealt with the case in relation to the amount of input learners are exposed to. Furthermore they did not provide us with study of perception and production mechanism to show how learners change their perception and production of syllable and stress.

In my study of L2 phonology of Arabic learners of English, I will reveal the mechanism at work in the perception and production of the syllable and stress. Thus my main research will be on learners and their exposure to TL, and the changes that happen in learner's phonological competence. This will shade light on syllable structure in onset and coda as they differ in MSA, LA and English. Furthermore the acquisition of the stress system of TL will show changes as learners are exposed to high amount of input.

4.5. Input and Teaching of English in Libya

As in other Arabic countries, English is taught in Libya under instruction. The grammar translation method is followed by most teachers at different stages. Most

materials used are books written by Mr Gusbi, a well known writer in English as a foreign language. His materials are composed of a series of text books and workbooks for preparatory and secondary schools, where not much attention is given to pronunciation teaching or to the involvement of the language laboratory.

At university level, most departments of faculties have a specific English course within their requirements. This course is usually from 2 to 4 hours a week for two years. In this course the student is introduced to terms related to his area of specialization. Again there is little attempt to teach English pronunciation.

In English departments, English is taught widely with the involvement of native English speakers. Moreover learners have the chance of visiting an English-speaking country for a short or long course in English. Students undergo a four-year programme studying English. Most courses involve the grammar of English, phonetics, English literature, comprehension, second language learning and teaching, translation, and linguistics. Listening and speaking skills are practised using the language laboratory. Each department is provided with a library where English books and periodicals are available for use by students. In addition there are book shops throughout the country where English books and dictionaries can be obtained.

By listening and watching TV programmes via satellite, learners could practice perception skills. Difficulties might exist in practicing speaking skills, as learners will not interact much with native speakers in conversation.

There are other institutions for learning English. They are private schools all over the country which are run by English teachers. These schools provide English courses during evening times and summer vacations. They rarely involve the students on trips to English-speaking countries. Thus teaching English pronunciation is limited. Moreover there is no access to new techniques of teaching. The communicative approach to language teaching has been developed only recently.

Research findings by Salem (1991) indicate that learners do not have sufficient L2 input in their first language setting nor do they have access to the target language accent. These shortcomings can be reduced by more exposure to language in its environmental settings and teaching English pronunciation by native speakers. Furthermore, the

communicative approach to language teaching is highly recommended in teaching English pronunciation.

Another important factor is the aim behind teaching the language. This factor is the filter towards language mastery. If teachers require learners to gain a certain level, then learners are motivated by the aim. Prosodic features can be practiced through rhythmic practice which requires training teachers to this level.

Production seemed to be problematic in the case of Libyan learners, as the results indicated, whereas perception seemed to be more accurate. This could be attributed to the fact that perception precedes production. Thus to train learners to produce more nativelike accents one needs to train them in tasks of repetition. A second way of dealing with the problem is to allow learners to spend more time exposed to the target language accent. This might lead to a sort of mastery at the level of prosody. The involvement of native language teachers at the level of pronunciation teaching is very important as well. Furthermore we can consider the amount of previous input in L1 settings in dealing with the amount of exposure to TL. I expect learners with high amount of exposure to language to show high mastery over syllable and stress if compared to learners with low exposure.

4.5.1. The role of teaching

In the case of our learners, two issues are to be taken in consideration. One of them relates to previous teaching methods, which shaped learners' competence, the other is related to exposure to the target language accent in its natural settings. One can benefit from previous research findings and contributions to pronunciation teaching as well as from the findings of previous studies. Thus one can say that it is very important to study the input in L1 and L2 settings. This kind of input shapes learners phonological competence, and leads to native or non-nativelike perception and production.

4.5.2. The role of the standard and the dialect

The investigation of first language phonological development and results gained from first language studies might reveal useful contributions to second language learning

if the two can be linked to each other in terms of their processes. It is argued that differences between the two kinds of pronunciation are apparent. These differences make comparison redundant. First language acquisition is informal while second language learning happens in the formal environment of school and classroom in L1 settings. Learners of first language acquire language in a natural order, whereas second language learners have the sequence dictated by the teacher or textbook.

The age of the learner is another potential difference. Second language learners are older than first language learners. As suggested earlier there is a critical period of language learning after which nativelike mastery is difficult (Cf. 2.1.2). One can still postulate that the strategies or the sequences of first and second language learning may be similar.

The learning of first language is shaped by the standard and the dialect of the language. Learners seemed to have an exposure to MSA in schools and through the media. The teaching methods in Libya as well as in the UK apply the standard variety. Thus learners normally acquire the standard in school but they do not practice it in the environment. So it is part of their perception and not in their production. This mixture of language shapes the competence of learners, and necessitates the study of the dialect and the standard if we need to find out a theory that links perception to production.

MSA in Libya is taught to students at school from the age of 6. Children have three hours exposure to the standard variety per week. They then practice their perception in listening and watching TV programmes. Media plays an important role in developing language varieties. The kinds of programmes direct the attention of students and thus develop their perception towards the variety. They will follow the standard or the dialect. One can note that perception and production of learners of English is affected by first language varieties. Learners switch from one norm to another but it is not yet clear when they use one and not the other.

At the age of six children start school and are exposed to MSA by learning the alphabet of their language. They normally have the ability to express themselves by using the dialect. Children start to read words and short sentences in school. After that they can express themselves in formal settings using the standard variety they have learnt.

Children practice the standard variety from 6-12 years of age where they are taught MSA in school. During this period they learn written Arabic. Materials include texts of Arabic, poems, and short stories. Children start to write short paragraphs using short sentences. Sentences are simple, complex and compound. Thus children can express themselves in presenting short stories. Their ability in producing and perceiving the standard form should be better at this stage. Moreover they can understand the spoken Arabic of the media. One can conclude that their cognitive abilities are shaped by the input from school and corrected in a sort of feedback in the environment. Teachers use different methods of teaching children during this stage. They have books, audio-tapes, and activities.

At the age of 13-16, students are exposed to different styles of writing Arabic in long composition texts. They try to write about different topics. Teachers help them in developing their ideas. During this stage learners are exposed to various varieties of language. They include LA, MSA, and English. So perception and production are affected by this mixture of language. Since learners are exposed differently, their rate of the influence differs from one learner to another.

After this stage media play an important role in shaping the competence of the learner. Media can improve the prestige of one variety over the other. In most cases MSA has high perception rate, LA has high production rate, and English has the highest rate of the interlanguage form. The interlanguage form, at this stage, can be seen as transfer or developmental.

Moreover the use of the standard is limited to class work only in the production form and to the media in its perception form. This means that learners use their production in writing their works when they are at school, and their perception when they listen to radio or watching TV, or reading newspapers.

This age of learning can work as the critical period for learning a second language. It is linked with puberty. In this period: learners' personality affected by many factors. Among those are the varieties learners are exposed to.

Crystal (1987) states that: when children arrive at school they experience a different linguistic world. They meet for the first time children from unfamiliar regional, social and ethnic backgrounds, whose linguistic norms differ greatly from their own.

They encounter a social situation in which levels of formal and informal speech are carefully distinguished, and standards of correctness emphasized. The education setting presents them with a variety of unfamiliar, subject-related styles of language. They have to learn a new range of linguistic skills: reading, writing and spelling.

After the age of 16, learners can develop their MSA differently. This is due to various options. At this stage learners follow different routes. Those who enter universities will have a better chance of practising their MSA and English. This will reduce the interference of LA variety. It seems that learners have the interlanguage form of Arabic and English at this stage. One can conclude that learners are affected by the standard in learning a second language. They do not use LA structure in learning English.

This can be seen in the results of our studies. The interlanguage phonology of Libyan learners of English is shaped by the standard and not the dialect of learners. They seemed to apply the clusters of MSA in learning English.

The most important finding is that while MSA does not permit CC initially whereas LA does, learners still have difficulty in mastering CC in English. Thus they seem to apply transfer rules of MSA. One can notice that the perception and production of our learners is composed of MSA and LA. Furthermore, learners switch between language varieties. In production of the target language learners apply the standard form and not the dialect one.

The teaching of MSA in Libya is carried out under instruction. Teachers use textbooks to teach the standard form in schools. There is also a possibility of teaching the standard form of Arabic in Mosques. Learners are taught the standard form through the Koran. This kind of teaching follows a method of recitation. In this method the standard form is learnt through practice.

MSA materials include the grammar of the language, its phonology and its orthography. In grammar, learners are taught different aspects of the language in terms of its system. Parts of speech are very important in the teaching of the grammar.
Sounds of the language are taught in a sort of recitation.

Learners normally achieve a high level in the standard by the age of 16. They can practice their perception and production in the environment. But as stated above their perception can be practised as they exposed to the standard form through the media.

Their production of the standard form will be limited to writing formal letters. This leads to the conclusion that perception and production will not be at the same level although they are linked to each other. Broselow and Park (1995) have shown this issue in their parameter splitting debate.

One can argue that L1 varieties play a major role in the production of TL. However as learners are exposed to TL settings their production will change. These changes starts in the perception, then affect the production. Varieties of the Arabic of my informants show different syllable structure and stress system. This system will affect the learner's performance.

In learning a second language learners will rest parameters or mis-set them. Their first language parameters will be affected by L2 parameters. Therefore I expect learners to have different resetting for perception and production. Some parameters of L2 will affect perception before production. Furthermore my informants are exposed to English pronunciation in Libya. This kind of input was not sufficient to be nativelike. Therefore IL forms with mis-set parameters were supposed to be clear in the production of English. This reveals the mechanism at work in the process of MSA and LA in shaping the phonological competence of the learner. It also sheds light on the kind of input learners are exposed to as they are at L1 settings.

4.5.3. Teaching English pronunciation in Libya

English teaching techniques must fit in with the specific requirements of the educational framework in Libya. The course used in Libya followed the grammar-translation method and assumed that learning is behaviourist. This course is oral and aural; it applies the book of M.Gusbi (1965) English for Libya. English language is introduced in terms of orthography and in the earliest stages the book depends on imitation and repetition. This course has some exercises related to sound discrimination, but there is no way of correcting the pronunciation of the pupil or the teacher. The students' self-correction method was the pronunciation dictionary, which helps them to identify some English sounds.

The previous input in the case of Libyan learners was insufficient. Learners have not had much exposure to the target language. As it seemed from their initial state of

learning, their mastery over pronunciation is affected by their first language. However, the role of the target language was obvious in their development towards a kind of mastery. This is clear in the changes of perception and production of some clusters in initial and coda position. The state of learning has become developmental, as acquiring processes seemed to be governed by target language effects.

One can conclude that target language input has a strong effect in shaping learners competence at the level of pronunciation. The mechanism at work occurs in both perception and production of clusters by vowel insertion or consonant deletion.

Teaching English pronunciation to Libyans should consider the previous input and current input. By current input, I mean that learners are under the effect of target language accentuation system. Exposure to this kind of input is very important to the language learner. Self-correction, or what we might call positive effect, is needed for success in acquiring the target language accent (cf.4.5).

Communicative teaching is the method to be followed in the case of teaching pronunciation to Libyan learners. One of the objectives of this study was to find out the changes in learners' phonology after exposure to target language accentuation. The features that had less change should be considered in teaching pronunciation to Libyan learners of English.

The assumption has always been that the most difficult items of foreign language phonology have to be approached and taught explicitly. However these items may vary according to learner's background and previous input. Results necessitate the kind of exercises to be created in order to cover gaps in learning sequences.

The hierarchies of errors lead to isolating areas of difficulty. This reflects the sequences in which specific clusters are learned. Furthermore it indicates the most useful items as prosodic features in the case of our learners. After this an explicit learning teaching method for pronunciation should be applied. This kind of method should involve techniques and materials which need to meet the specific requirements of our learners, based on difficulties encountered by Arabic learners and non-acquired items as well. A number of items tested in the study of perception and production will not need to be applied in teaching. Syllabic and prosodic items which will not hinder intelligibility if they are produced incorrectly might be ignored.

The natural approach to teaching implies that pronunciation can be taught through communicative oral and aural English. Furthermore it should be part of all the other components of the course. The problem is that teachers are not native speakers of English. Their standard is very low in English pronunciation. Teachers have inadequate training and no much exposure to English in target language environments. It is because of these shortcomings learners come with a low mastery of pronunciation. In addition the changes in their L2 phonology will take longer once they are exposed to a target language environment.

The implication of this study to teaching pronunciation is that if such methods are ineffective and the teacher's pronunciation is poor, there is a need to apply other methods or techniques in teaching. Such methods should include native English pronunciation in recorded form, or the involvement of native English speakers. This will reduce first language influence and help in the development of accent. Results can improve the standard of English pronunciation among Libyan learners; furthermore they can shed light on the need for better approaches to work with new techniques for better pronunciation both at L1 and L2 settings.

Research studies demonstrate that second language phonology can be improved if pronunciation training is offered in a focused program in isolation from other skills and if the program involves perceptual training such as audio and visual feedback (Pennington 1998). Therefore, a program of instruction is recommended that helps learners to concentrate on sound, with the focus on those areas of pronunciation which have the greatest benefit for the learner in terms of real communication goals.

In the case of my subjects, it is obvious that they were exposed to a non-native accent in Libya. But as they come to TL setting their phonology should undergo changes. These changes will be in their perception and production of English. However these changes will not be at the same level of syllable structure and stress. I expect learners to show high mastery of perception in syllable and low mastery in perception of stress. That might also be the case in the production of the syllable and stress.

4.5.4 The acquisition of metrical parameters by Arabic speakers

Few studies address the learning of metrical parameters by Libyan learners of English; still, there are some studies which provide results related to other Arabic varieties. Youssef and Mazurkewich (1998) investigated the acquisition of English metrical parameters and syllable structure by adult native speakers of Egyptian Arabic. Their results regarding metrical parameters and stress placement indicate that UG plays an important role in the process of L2 acquisition by constraining the range of possible hypotheses that L2 learners entertain about L2 constructions. Moreover, there is evidence to suggest that L2 learners can be guided by L2 parameter values. This can be seen in the items that involve the extrametricality parameter, and the directionality parameter in building metrical feet see table (4.1) below. The results, however, do not provide compelling evidence for transference of L1 parameter values to L2, as almost all the parameter settings for Arabic correspond to the default setting in UG.

Their results indicate that participants performed better in the production compared with perception. This finding was in line with Archibald (1993) whose participants performed better in the production tasks. In comparing word and sentence tasks they find that participants performed better in sentence tasks. They attributed this finding to the fact that sentences involved more cognitive text than words.

Metrical parameter settings for Arabic and English:

Table 4.1

		Arabic	English
P1	The word tree is strong on the	[Right]	[Right]

P2	Feet are	[Binary]	[Binary]
P3	Feet are built from the	[Left]	[Right]
P4	Feet are strong on the	[Left]	[Left]
P5	Feet are quantity sensitive	[Yes]	[Yes]
P6	Feet are quantity sensitive to the	[Rime]	[Rime]
P8A	There is an extrametrical syllable	[No]	[Yes]
P8B	There is an extrametrical segment	[Yes]	[Yes]
P8	The extrametrical element is on the	[Right]	[Right](127)

They conclude that the influence of L1 parameter values was apparent in the form of syllable structure transformations that were applied to the L2 syllable structure in order to make them conform with well-formed syllable structures in L1, and not to the universally unmarked CV syllable. The syllable simplification strategy applied was that of vowel epenthesis and not consonant deletion. I argue that this strategy influences syllable structure and thus affects stress assignment.

4.5.5 Perception of epenthesized forms by Arabic speakers

Arabic learners use epenthesis in acquiring English syllables. This phenomenon occurs in Arabic in two types. The first one is the insertion of a vowel between two consonants clusters of a CVCC word. The second type applies across morpheme boundaries of tri-literal and quardri-literal clusters. In CVCC epenthesis, there are two types: the first is concerned with the breaking up of final CC clusters by inserting a vowel between the two consonants, on the condition that the final consonant is more sonorous than the one preceding it, and the inserted vowel is identical to the stem vowel. See Mousa (1994).

(26)

[qutn]	[qutun]
[tifl]	[tifil]

The second type of epenthesis take place between the final consonants of CVCC concerns the stem vowel /a/. i) The stem and the epenthetic vowel are identical. ii) The stem vowel is /a/ whereas the epenthetic vowel is either /i/ or /u/. In epenthesis across morpheme boundaries, the vowel /a/ is always inserted between C2 and C3 to create a nucleus to a stranded consonant. This type of epenthesis applies to tri-literal and quadric-literal clusters.

Epenthesis and deletion are two strategies followed by L2 learners in acquiring the phonological system of the TL. Speakers with different language backgrounds use one of the two strategies. First language and second language acquisition involve different strategies. First language learners use cluster reduction whereas second language learners use vowel insertion. The following examples are stated by Oller (1974), reported in Tarone (1980):

L1	L2
Cluster reduction	Vowel insertion
Blue----------→ bue	Tree --→ t↔ree
Final consonant deletion:	vowel addition.
Big----------→ bi	Big---→ bigu
Weak syllable deletion	weak syllable deletion
Banana----------→ nana	Rare

Figure 4.2

Learners of L2 sound system use different strategies. Native speakers of Arabic break clusters and insert vowels. Moreover speakers of different dialects epenthesize at different places. I repeated data from above to show a comparison between two dialects of Arabic. Broselow (1982) (1987) cited that:

Iraqi learners of English	Egyptian learners of English.	
chilidren	children	"children"
ifloor	filoor	"floor"
istrit	sitirit	"street"
iblastic	bilastic	"plastic"
ifred	fired	"Fred"
itranislate	tiransilate	"translate"

Figure 4.3

It is further stated by Young-Scholten and Archibald (2000) that the very young child might proceed with the words 'tree' and 'spoon'. That children are operating under a non-adult system is attested to by the extremely robust findings that words in the ambient input regularly undergo various sorts of modifications before being produced by the child. In these two words, we find a range of possibilities regarding what the child might conceivably produce. Thus possible syllable modifications for "tree" and "spoon" are as follows:

		tree	spoon
a.	V	[i]	[u]
b.	CV	[ti]	[su]/[pu]
c.	VC		[un]
d.	CVC		[sun]/[pun]
e.	CVCVCV	[tiri]	[sipuni]
f.	C1 Cx-→C1Cy	[twi]	[swun]
g.	C1C2-→ VC 2 VC1	[tir]	[sup]

Figure 4.4

Based on the epenthesized forms above I made examples for my informants to test their ability. However with respect to the similar and different words below in (27), I expect learners to have different strategies in the perception of syllable structure with

epenthesis. They will perceive similar words as different and they will also perceive different words as similar. One can predict that they will mis-set parameters that relate to some forms but that they are acquiring the accentuation system of the language.

(27)

"iclear"	I said the word iclear.	The answer was " different"
"clear"	I said the word clear.	The answer was "different"
"iclear"	I said the word iclear.	The answer was "different"
"iclear"	I said the word clear.	The answer was "similar".

Moreover, I expect low-input and mid-input learners to have similar strategies while high-input learners to have different ones. High-input learners will be more sensitive to the perception of epenthesized forms.

Arabic speakers used epenthesis in different positions. It seemed that Libyan learners perceive epenthesis in different positions. In other words, they are not controlled by a single strategy. So, as stated above, the two versions of chilidren and childiren are correctly perceived. This leads to the conclusion that Arabic varieties (LA) don't matter that much here, but the standard seems to have a significant role.

In addition to the perception of epenthesized forms, I expect that learners perceive the same words as different and different words as the same, as shown in Figure 4.5 below:

Incorrect perception.				Correct perception.			
Bop	bob/	bop	bop.	bob	bob		
Vast		vast/		fast	fast/	fast	vast
Save		save		safe	save/	safe	safe
Leave		leave		leaf	leave/	leaf	leaf

Figure 4.5

What learners in the study had to do was recognize in the set of the above words when listening to them on tape whether they are similar or different; this tests their perception. I will explain the methods used in the next chapter.

4.5.6 Incorrect perception and production of Arabic speakers

In L2 phonology non-native learners are likely to produce and perceive non-target forms. Broselow (1988) discusses several patterns of incorrect production and perception of a foreign language, and offers accounts of these error patterns in terms of a particular theory of the representation of phonological structure. As stated above, all the errors discussed involve some aspect of prosody, and are argued to result from differences in constraints on prosodic structure in the native language and the foreign language. These error patterns are interesting from two perspectives. First, the cases discussed provide justification for the claim that linguistic theory is relevant to (L2) acquisition by presenting evidence that the errors of language learners can be seen as perfectly comprehensible and even predictable given particular theoretical constructs. Second, the patterns discussed provide evidence for the relevance of data from L2 acquisition to the concerns of linguistic theory. She argues that error patterns may provide evidence for particular analyses of the native language grammar, evidence that may not be available from the study of the native language alone.

Production errors of L2 strings are triggered by a mismatch between the prosodic constraints operating in the native and the target languages: in the first case, a mismatch in the definition of possible syllable, and in the second case, a mismatch in the definition of possible word. In both cases, a linguistic analysis motivated by the facts of the native language alone receives additional confirmation from the behaviour of learners attempting to produce L2 forms.

Perception errors may also be accounted for by differences in the prosodic structure of English and Arabic. These errors, however, involve the perception of foreign language strings and they involve the incorrect segmentation of strings into words. They are referred to as constraints on cross word syllabification and constraints on metrical structure of words.

In one study, Anani (1989) states in the case of Arab learners of English that learners tend to divide English words into syllables to make them coincide with the total syllable pattern typical of the underlying phonological structure of Arabic. The overall stress patterns of English words, in particular, generally conforms to the total stress pattern of Arabic, characterised by fixed word stress placement and more restricted

syllable structure, in contrast with English unconstrained syllabication and free stress patterning.

Furthermore, Youssef and Mazurkewich (1998) deal with two areas of L2 phonology, namely metrical parameters with special reference to stress placement theory and syllable structure by native Egyptian Arabic speakers of the Cairene dialect who are L2 learners of English. They argue that adults learning an L2 can access the principles of Universal Grammar (UG) and are able to reset parameters for the L2. Furthermore, they show that although there may be interference from the first language (L1), there are other factors involving the interaction of L1 and L2 parameters that need to be taken into account.

Thus I can predict that perception and production in L2 phonology is different in syllable structure and stress, yet it is driven by structure and process. So it is not sufficient to say that perception precedes production but the mechanism at play in TL acquisition is guided by perception and production of L1.

I suggest that, in studying perception and production of Libyan learners of English, we have to consider the role of MSA and LA and their effect on each other in terms of phonological competence. Another aspect is the teaching of the language in L1 setting which means the previous exposure to L2 before learners come to TL settings.

This assumption leads to the conclusion that learners who are exposed to such non-target accented variety will not attain nativelike competence in the target language. Moreover a non-accented variety of a target language might exist in L1 settings and might end with a deviation from the norm.

The aural input foreign language learners receive in a non-target classroom setting is from their teachers and peers in English conversation. Learners' exposure is limited only to a few hours of phonological input. This input is primary linguistic data and could be regarded as positive evidence (Young-Scholten 1995). But it is problematic in the way that the learner is exposed to the L1 accent. This accent is positive evidence with negative effect. Learners are always exposed to a recorded input that represents varieties of L2 English.

The interesting research question is to what extent exposure to native speaker L2 input following exposure to non-native-accented L2 input results in changes in the

learner's interlanguage phonology. In other words what effect exposure to positive evidence with positive effect will have on L2 learners who received foreign-accented input for many years? Does their phonology undergo any changes when they are supplied with this sort of primary linguistic data or, after years of bad influence, is it too late for their linguistic competence to undergo changes? If they do show changes over time, what kind of changes are these?

Akita (2001) was the first to ask these questions and she carried out a longitudinal study in the case of Japanese learners of English in L2 phonology. Whilst adopting her methods of collecting data, I am applying it to the case of Arabic learners of English in a cross-sectional study. The present study was designed to address the shortcomings of previous studies on L2 phonology of Arabic learners of English (cf chapter 2). Data includes two areas of phonology, syllable structure and stress. Both perception and production data were collected looking at the interaction of various sub-systems. In the perception of syllable, I predict learners to perceive epenthesized forms as correct. I also predict that learners will have some difficulties with CCC clusters as they are not transferring their L1 rules. They will master this sequence as they are exposed to TL accentuation. In the perception of stress, I predict learners to have difficulty with stress in a sentence but they will have little difficulty with word stress. In the production of syllable, learners seem to use epenthesis or deletion but most importantly, I expect them to produce CCC target language clusters in a syllable as they are exposed to TL accentuation for long period. In the production of stress, I predict that learners will misplace the stress in penultimate at early stages of learning and master stress as they are exposed to the TL accent.

In what follows, I will try to find out the effect of exposure to TL accent after an exposure to non-native accent mainly foreign language teaching. The changes that appear in the interlanguage phonology of the learner will be traced in terms of perception and production. This investigation will be carried out within the TL environment. I expect my learners to perceive and produce syllable structures that are different from the L1 and L2 or to gain nativelike mastery. Furthermore, they will adopt stress assignments of L2 as they are exposed to target language input. I will concentrate on syllable and stress as they

are both currently under investigations. Specifically, I will concentrate on clusters within a syllable, word stress and stress in a sentence.

I predict that Arabic learners will show heavy use of epenthesis as they have low exposure to English. Later, and as they exposed to high amount of input, they will show mastery of CC and CCC clusters in various position of a syllable. However this mastery will not be at the same level of perception and production for some reasons revealed later. For stress, I predict that Arabic learners will acquire the stress system of English as they have a high amount of input in the TL. This system will be guided by the Arabic stress system at early stages and later by the English accentuation system. Thus one can say that at early stages learners will be guided by transfer and after exposure to native English accentuation their processes of learning will be developmental. My study will show the changes after an exposure to English in target language settings and the effect of L1 in the use of epenthesis. These issues have not been studied in depth by previous researchers.

Chapter Five

The study

5.1 Introduction

In this chapter, I will first present the research methodology and subjects of the study. Then I will present methods of collecting data of both the perception and production study. These methods will cover syllable structure and stress in isolation and stress in a sentence and for syllable structure the sequence of CC and CCC clusters in onset and coda. Then I will present the hypothesis and data analysis. In the second part of the chapter I will present the results.

5.2 Research Methodology

The central purpose of this section is to present the specific methodological procedures used to obtain the data. This methodology refers to the basic plan of the research and the logic behind it. Furthermore, it identifies the way in which the research was arranged to produce specific answers to my research questions. Thus I discuss the nature of the population, the sample and sampling procedures, the methods of data collection and analysis. As mentioned earlier the study was carried out to examine the effect of primary linguistic data over time on learners who had received a limited amount of input, often foreign–accented, prior to arrival in the UK. All subjects arrived in the UK with the same amount of English. They had studied English in Libya under the same methods and instruction. The data were obtained in interviews during which the subjects met individually with the investigator. Each subject met the investigator for one time to complete all tasks.

5.3 Subjects

The sample consisted of three sub-groups. These groups were made up of 23 postgraduate, native speakers of Arabic continuing learning English. Based on their length of stay in the UK, learners were grouped into three groups: little TL exposure, moderate TL exposure and considerable TL exposure. Little TL exposure learners are learners who have had weeks to several months of input, but less than one year. Moderate TL exposure learners are learners with 1-2 years of input. Considerable TL exposures are residents, and they are subjects with 3-5 years of input. This classification was based on length of stay. Those categories were chosen during collecting data. Low input learners represent a base line of what English learners who have gone through the Libyan school system arrive in an English speaking country with. I supported this by a sample of five native speakers of Libyan Arabic with less exposure to English to test their production of CC clusters in Arabic to find out the possible interaction of Libyan Arabic and MSA. Table (5.1) below shows learners, their dialect of LA and their exposure to native accented target language in the UK. Learners have different amount of exposure to English in Libya. PhD students have more input, University degree student have less input. My informants of University degree are in their final year of study.

Table 5.1

	Level of exposure	Amount of exposure in the UK	*Place*	*L1 dialect*	*Degree* Pursued
1	Low	2 Weeks	Manchester	Libyan/North	Uni.Degree.
2		2 Weeks	Manchester	Libyan/North	Uni.Degree.
3		6 Weeks	Manchester	Libyan/South	Uin.Degree
4		6 Weeks.	Manchester	Libyan/North	MA
5		5 Months	Manchester	Libyan/North	PhD
6		5Months	Manchester	Libyan/North	PhD.
7		6 Months.	Manchester	Libyan/South.	MA.
8		8 Months	Manchester	Libyan/South	PhD
9	Mid	1-2 Years	Sheffield	Libyan/South	MSc.
10		1-2 Years	Durham	Libyan/North	PhD.
11		1-2 Years	Newcastle	Libyan/South	MSc.
12		1-2 years	Newcastle	Libyan/South	MA
13		1-2 Years	Manchester	Libyan/North	MSc
14		1-2 Years	Manchester	Libyan/North	PhD.
15		1-2 Years	Manchester	Libyan/North	MA
16		1-2 Years	Manchester	Libyan/North	MA.
17		1-2 Years	Manchester	Libyan/South	PhD
18		1-2 Years	Manchester	Libyan/South	Uni.Degree.

19	High	3-5 Years	Sheffield	Libyan/South	PhD.
20		3-5 Years	Newcastle	Libyan/North	MSc.
21		3-5 Years	Manchester	Libyan/North	PhD.
22		3-5 Years	Manchester	Libyan/North	PhD.
23		3-5 years	Manchester	Libyan/North	MSc.

All subjects had previous input of English in Libya and were taught English by native speakers of Arabic. Learners were given a questionnaire to find out more about their exposure, age, exact length of time and English varieties and the results are shown in the appendix (J). Although this showed that learners were exposed to some other language teaching materials such as TV and radio, the role of English native speaker was very low. Furthermore the input was insufficient in native language settings (in Libya). The grammar translation method is followed by most teachers at different stages. In high schools learners have 4-6 hours per week. At university level learners have 2-4 hours per week. In dealing with test subjects, learners were grouped according to their length of stay in the UK as low, mid and high input. (cf 4.5.3 above)

Although learners were exposed to different varieties of English, these varieties do not differ with respect to the aspects of syllable structure and stress studied. I did not use a control group but I referred to native speakers in developing the tasks and checking the results.

5.4 General Research Questions

What effect will exposure to "positive evidence with positive effect" have on L2 learners who have received foreign-accented input for many years? Does their phonology undergo any changes when they are supplied with PLD from native speakers, or after years of negative influence, is it too late for their linguistic competence to undergo changes? If changes are evident, what kinds of changes are there in their perception and production?

5.5 Methods of collecting data

Data collection covered both the perception and production of syllable structure and stress in English. The testing instrument applied included 3 divisions. To obtain as full as possible a picture of phonological competence, the first two divisions covered perception whereas the last division covered production. Perception tasks had more words than production in the testing instrument but the production had more data in transcription. Both tasks covered syllable structure and stress.

The first division covered perception of syllable structure initially and finally with epenthesis in onset and coda and included 185 words. The total test words in this battery were 740. The insertion of epenthetic vowel marked most of the items, as in plastic/ pilastic/ iplatisc /. They all represent CC and CCC clusters in onset and coda. (see Appendix C).

The second division covered the perception of metrical stress, and included two sub-divisions: division (2A) included 28 words which tested the perception of stress in words, whereas division (2B) included 28 sentences which covered the perception of stress on words in sentences. The number of sentences in division (2B) was 84 with grammatical and ungrammatical forms of stress. These numbers of items were based on the choices of classes related to stress in different positions of the syllable. Each sentence of the 28 has three versions where the stress put in ungrammatical position and produced 84 sentences.

The third division contained three sub-divisions, division (3A) included 9 words, they covered the production of stress, division (3B) included four pictures; they covered the production of syllable, and division (3C) included 28 sentences to cover the production of stress on words in sentence.

Table 5.2 the testing instrument

Division	Total test items	Type of task
1	185 words	Perception of syllable
2A	28 words	Perception of stress
2B	28 sentences	Perception of stress
3A	9 words	Production of stress
3B	4 pictures	Production of syllable
3C	28 sentences	Production of stress

In terms of ethics subjects were given numbers to refer to their data and told that data were to be used for research purposes only. For testing procedures the perception tests were collected first after which production tests were carried out. Subjects had breaks from two hours to three hours. The next part will cover in more detail data collection for perception and production.

5.5.1 The Perception tasks

The perception tasks cover syllable structure and stress. For syllable structure, clusters in onset and coda are represented. The stress includes stress in isolation and stress in sentence. These tasks are tape recorded materials of native speaker of English which are represented to subjects in various versions. Subjects listen to the tape and answer in a form presented for collecting data.

5.5.1.1 Methods

Data collection methods for perception of syllable and stress consist of selected clusters and classes of stress. These methods include CC and CCC clusters in onset and coda position of a syllable where epenthesis plays a major role. Classes of stress in initial and final position in nouns and verbs are tested in words and sentences.

5.5.1.2 Syllable perception

Based on the contrastive analysis of MSA, LA and English syllable structure in (Cf 3.2.7 above) and on the strategies followed by learners of English in breaking the

sequence of clusters, I created 740 test words in grammatical and non-grammatical forms based on words in table 5.2 task 1. . In a technique has been used by Akita (2001) for Japanese learners of English and Brown and Matthews (2001). The perception of syllable structure in grammatical and non grammatical forms was tested by using epenthesised and non-epenthesised forms in initial clusters and final clusters. i.e. *plastic* and *pilastic*, *plastic* and *iplastic*. Learners listened to a tape and ticked an answer sheet to see if they could recognise the two forms as identical or different. The following sequences were included: initial clusters CC---, final clusters –CC, final clusters ---CCC. Akita chose 76 test words which reflected sequences of sounds not present in Japanese. My test items were 740 based on clusters which are not present in Arabic and the epenthesis which is used by different speakers of Arabic varieties in speaking English. Those words involved onset clusters, coda clusters and word final-consonants. My test items are different from Akita because Arabic differs from Japanese in sequence of sounds in clusters. Akita used permissible target structures and epenthesised forms of the same word. Brown and Mathews used epenthesis but with three types of experimental stimulus items. Their cluster type included items with a medial obstruent clusters (-kt-, -pt-, or –bd-). They were not as the same used in my tests since I used onset and coda clusters.

Subjects first heard a word on tape of male native speaker of English, and then either the same word, or the epenthetic version, was presented, embedded in a sentence: "I said the word----------." Thus there were four possible combinations with permissible target structures ("T" forms, below) and epenthesised forms ("E" forms). They included 185 different words in 740 versions:

(1)

a. plastic	I said the word plastic.	(T – T)
b.plastic	I said the word pilastic.	(T –E)
c.pilastic	I said the word plastic.	(E –T)
d.pilastic	I said the word pilastic.	(E –E)

Subjects were asked to mark whether the word in isolation and the word in the sentence were identical in each set or not. Thus if the subject heard a combination of T – E or E-T, they were expected to answer No, and if they heard E –E or T-T, they were expected to answer Yes. The purpose of the task was thus not to test whether subjects could judge which form was correct, but whether they could perceive when there was a difference between the two.

Dealing with clusters in the above mentioned cases, I covered epenthesis used by different speakers of Arabic in speaking English as stated in Broselow (1988). As mentioned above, Egyptians and Iraqis, insert /i/ in different position in syllables. In creating the testing instrument, I inserted an epenthetic vowel in clusters as in iCC and CiC based on Arabic varieties. So iplastic and pilastic are both appeared in the test.

5.5.1.3 Stress perception

Both primary stress in isolation and stress in a sentence on words were also tested in the perception task table 5.2. task 2a & 2b. The stress in sentence on words was tested to find out if learners could judge the grammatical and non-grammatical forms of stress. For stress in isolation, stress appeared in various correct and incorrect positions depending on the class of the stress. Learners had to indicate the place of the stress on the first, second or final syllable. They listened to the word on tape of male native speaker of English and ticked in a sheet in front of them as shown in (2) below. Different classes of stress were tested. They were in verbs and nouns as stated in Archibald (1993) (see Appendix D&E)

(2)

aroma

arena

Learners listened to the above word on tape in the answer sheet they ticked the box to show where they perceived stress. All 28 words have correct stress but in different positions. Subject would find this test easier as it involved correct forms of stress.

First ☐ second ☐ - last ☐

For stress on words in sentences, learners had to listen to sentences in which there was correctly and incorrectly stressed final words, as in Table 5.2 task 2b. They had to listen to each sentence separately. Learners had to judge if the sentences were correct, odd, not-correct, or don't know. Subjects were given an idea about the stress as in the last words in the sentence. They had the chance to listen to the same sentence if they asked for. This test is more difficult because learners had to judge the acceptability of the stress in the sequence of a sentence. Furthermore they have to listen to similar sentences with variations in the last word.

(3)

Tape:

1.a. The thing I like about coffee is the ARoma.

1.b. The thing I like about coffee is the aROma.

1.c. The thing I like about coffee is the aroMA.

(4)

Answer sheet: Learners chose one answer as they listened.

1.a.	Correct ☐	a little odd ☐	don't know ☐	very odd ☐	incorrect. ☐
1.b.	Correct ☐	a little odd ☐	don't know ☐	very odd ☐	incorrect. ☐
1.c.	Correct ☐	a little odd ☐	don't know ☐	very odd ☐	incorrect. ☐

Based on the assumption that prosodic features of English and Arabic systems are not compatible (cf. chapter 2 above), transfer was predicted by the mismatch between the metrical parameter settings of the two languages. The following classes of English accents (stress), adopted from Archibald (1992) and are shown in (5) below:

(5)

7 classes of English stress.

Class 1 (noun) : penultimate stress (tense vowel in the penultimate syllable)

Class 2 (noun) : penultimate stress (branching rime in the penultimate syllable)

Class 3 (noun) : antepenultimate stress (neither tense vowels nor CCs to attract stress in the penult)

Class 4 (verb) : final stress (tense vowel in the final syllable)

Class 5 (verb) : final stress (consonant in the final syllable)

Class 6 (verb) : penultimate stress (the final syllable contain neither tense vowels nor CCs)

Class 7 (noun) with primary and secondary stress.

There were four words per class; thus a total of 28 words were involved. Words unfamiliar to the subjects were chosen. This choice was taken because it has been argued by Tarone (1987) that stress patterns in English are lexically stored and knowledge of the word might affect learners' performance. Grammatical and ungrammatical forms in terms of accentuation of these words were included. This is because both being able to tell the correctness of a form and its ungrammaticality is part of native speaker competence.

In a word such as "synopsis" which is a class 2, penultimate accent noun, both "synOPsis" and "SYNopsis" appeared on the test. Subjects were asked to indicate the place where they thought the word was most strongly pronounced, and then asked to decide to what extent the way the word was presented was acceptable in the target language. The aim was to examine whether subjects could perceive the correct stress in the test words and to test their internalised rules for the L2 English accentuation system. As shown in (6) below.

(6)

SYNopsis

Subjects were expected to answer:

Correct little odd don't know very odd incorrect.

5.5.2 The Production tasks

The production tasks include reading and description of pictures. In the reading tasks, there are words and sentences. The description task includes pictures shown to subjects where they had to talk about them. Learners had a variety of tasks and no interference was found when there were similar sets of words used. Instead, this provided the chance to explore the relationship between perception and production. These tasks were taped and then transcribed. In the transcriptions stress is marked and clusters are also noted.

5.5.2.1 Methods

For the production tasks, two kinds of technique were used. In one learners had to read 9 unfamiliar words and 28 sentences with seven classes of stress (table 5.2 above task 3a) from a paper in front of them which they were tape recorded. In the second learners had to describe four pictures, as in table 5.2 task 3b, which covered clusters as in the perception tasks and the investigator recorded their production for further analysis. See Appendix (I)

5.5.2.2 Syllable production

For syllable structure the processes of epenthesis, substitution and deletion are considered within the syllable. In clusters, the production of the same clusters in perception test could not be controlled. This means similar data were not possible. However I relied on the assumptions made on the perception of syllable structure to find out learners' production of clusters in syllable structure. As learners described pictures, clusters in onset and codas were transcribed for a more detailed description (see Appendix H). For processes within the syllable learners read words. Errors in production of syllables were coded and studied.

5.5.2.3 Stress production

For stress on words in isolation, learners read single words where the production of incorrect placement of stress was traced for further investigation. Table 5.2 task 3a.

Examples:

(7)

Stress in isolation:

1a psychosis

1b trachoma

1c tectonics

These words were unfamiliar words that learners do not use in everyday conversation. Some words were the same or similar in the production and the perception tasks. Therefore the perception tasks were given first based on the idea that if subjects did produce these words first, they would not be aware they were the same words. These non-familiar words were used to show the correct stress production as learners did not listen to them in the perception tests in task 2b. For stress in a sentence, learners read sentences from a paper in front of them. The last word in a sentence is checked for the correct stress placement. See Appendix (F&G)

Examples:

(8)

a. The thing I like about coffee is the *aroma*.

b. The town asked for a big loan to build an *arena*.

Some repeated sentences were deleted.

5.6 Specific research questions

Are there any changes in the case of Libyan learners of English phonology? If these changes appear at the phonological competence, is it in the perception and

production of syllable or stress? If these changes happen in syllable and stress, are they in onset or coda of syllable, or stress in a word or a sentence?

In case of changes in onset and coda, which sequences appear to be more difficult than the other? What role is played by the first language variety (Libyan Arabic vs. the standard MSA) in shaping the phonological competence of learners in TL settings?

I will investigate the changes in learners' phonology in perception of syllable structure, clusters, stress in isolation and stress in sentence. Then I will investigate the production of syllable in the processes of epenthesis and deletion, the stress in grammatical and non-grammatical forms.

In the production of MSA CC clusters are not permitted in onset whereas in LA these combinations of clusters are allowed. Thus the use of epenthesis is followed by my subjects in producing LA and English. I will investigate the use of epenthesis as developmental processes rather than transfer of L1.

I assume that the input factor has a major role in changing the phonological competence of the learner. The previous input in L1 settings and the input in TL setting are considered in my study. (cf 3&4). Teaching English pronunciation in Libya is previous input. Learners were exposed to non-native accentuation system in studying English. As they come to live in England their accentuation system undergo changes, these changes depend on length of stay. This means the amount of exposure to English is very important factor. Young-Scholten (1995) mentions that second language learners receive positive evidence, but also typically receive negative evidence in the form of corrective feedback and explicit evidence in the form of explanation, within the context of formal instructions. While adult L2 learners receive a considerable amount of negative and explicit evidence, it is by no means a given that such evidence has any impact on the learner's L2 linguistic competence. The aural input learners in a foreign language classroom receive from their teachers and their peers is primary linguistic data and functions as positive evidence. A problem arises with positive evidence in the classroom when the input constitutes an accent which deviates from whatever the standard the learners are exposed to acquire. While classroom L2 learners are often also exposed to recorded input which represents the variety of L2 to be acquired, the aural input received from the teacher and especially the learner's classmates is typically L1-accented. Non-

native accented input is thus positive evidence with negative effect, at least in terms of the researcher's desire to measure whether the L2 phonology has been acquired.

However transfer and developmental error are related to level of learners. Archibald (1998) states that beginner' learners will show high transfer errors and low developmental errors. Intermediate learners will have medium transfer errors and high developmental errors. Advanced learners will have low transfer errors and low developmental errors.

Based on contrastive analysis of MSA, LA and English phonology, I found out variations among syllable structure and stress. In syllable structure there are some differences in onset and coda. These differences are in CC and CCC clusters. Epenthesis seemed to be a significant feature in dealing with these clusters as suggested by previous studies. In stress there are some variations too. The rules of stress assignment of English and Arabic are different (Cf 3.2.8.2). Arabic speakers therefore have problems with the unpredictable nature of English word stress.

Mousa (1994) carried out study on Arabic speakers acquiring English. Their interlanguage phonology was analysed in terms of syllable and stress. The study was undertaken at L1 settings. Thus Mousa could not support any developmental stages. In my study I will investigate the developmental changes in learners' phonology as they are exposed to the amount of input in TL settings and I will carry on the research to find out the mechanism at play in perception and production by Libyan learners.

5.6.1 Hypotheses (147: the hypotheses have now been numbered, single-spaced and indented)

Dealing with syllable and stress in Arabic and English as well as perception and production of learners, the topic covers many hypotheses:

> H1: Learners will show improvement according to their level. This is based in the amount of input learners are exposed to. Thus low, mid, and high input learners will show developmental stages in acquiring syllable structure and stress of English. This will be in both perception and production. They will show mastery over perception before production in mastering TL. Learners will use their L1 syllable structure at early stages later, they will acquire TL structure.

H2: They will show developmental stages in the perception and production of clusters in onset and coda based on the amount of input. As they are exposed to sufficient input, learners will perceive and produce clusters of English without epenthesis. Thus learners will have no difficulty in producing and perceiving English clusters as they have high amount of input.

H3: In general, learners will acquire syllable structure of English first. Then they will show mastery over stress assignment. This is due to the fact that syllable structure plays major role in acquiring stress of a language.

H4: They will show development in the perception of grammatical forms of stress. Thus learners will get the stress right in late stages. High input learners will show greater mastery over stress.

H5: Errors in syllable structure and stress assignment will decrease with level of learners. This is due to the fact that errors are not based on transfer of L1 at late stages; rather they are results of developmental stages.

H6: Arabic varieties will have a significant role in shaping the phonological competence of my subjects in the case of low input learners only. The fact is that low input learners come to the task with their Arabic structure. When these learners exposed to English input their phonological competence undergo changes towards TL structures. This will be clear in the case of mid and high input learners.

H7: In clusters sonority will play a major role as learners will follow the rules adopted by sonority scale. This is due to the fact that the ease of acquisition corresponds to the degree of sonority. But developmental stages could play a remarkable role as well.

H8: Error rate will decrease for Arabic-based errors at the same rate as developmental errors. Therefore learners will show fewer errors of transfer and development as they exposed to high amount of input. I predict that learning will be driven by transfer and developmental processes, at early stages of learning acquisition will be guided by high transfer error and low developmental errors. At late stages acquiring will be guided by low transfer errors and low developmental errors.

5.7 Data analysis

Data analysis involved several stages:

In stage one all perception result sheets revised and coded. Then I marked the correct answers in percentage. I transferred all percentages in tables and put them into a database in the computer using excel and SPSS package. In stage two I checked the same sheets for incorrect answers and coded clusters for further study. In stage three all production tapes were transcribed and checked by a native speaker. Then I coded errors. I studied each learner's production first after which I studied results of all learners in relation to the other groups.

For syllable perception, overall results of the task tabulated. Then results of each cluster were driven out. Errors in each task were taken and compared with the group. For the perception of stress in isolation, I calculated all correct answers. Then I tabulated all scores. The same procedures were followed for the perception of stress in a sentence. Errors of each task were calculated and put in a table.

In the production of syllable, the clusters appeared in the transcriptions are put in a table as they represented the correct use of clusters without epenthesis. Other processes within the syllable are calculated and figured in a table.

For the production of stress in isolation, I checked correct placement of stress in the word and put the percentage in a table. In the production of stress in sentence, I calculated and tabulated all correct answers for each subject.

5.7.1 Results

I will discuss results of perception of syllable, syllable clusters, and the perception of stress. After which I will discuss results of production of syllable and production of stress. Syllable structure results are based on correct answers of each group to find the developmental stages. Thus errors of each group in syllable were rated. The examples were taken to show the place of epenthetic vowel. It is obvious that wrong syllable structure was marked with epenthesis. That is the insertion of a vowel to break clusters in onset and coda. But as learners perceive the correct form of clusters, they realize the difference between the grammatical and non-grammatical form. Low input learners could

not indicate the difference. Mid input learners show good results whereas high input learners show higher results in syllable structure. However, my data did not go beyond clusters of syllable structure in onset and coda perception and production.

Results show the overall percentage of perception of syllable, stress in isolation and stress on words in sentence by low, mid, and high-input learners: The figures are based on perception tests. Further links with production will be dealt with in the discussion part. They showed high mastery over syllable in comparison with stress. Whereas within stress rules, learners showed different rates on stress in isolation in comparison with stress in a sentence. For stress in a sentence, learners had lower scores in comparison with stress in isolation.

5.7.2 Results of perception tests

5.7.2.1 Results of syllables

Overall results of syllables are calculated based on correct answers of grammatical and non-grammatical forms. The grammatical forms are words without epenthesis whereas non-grammatical forms are the ones that have epenthesis. CC and CCC clusters are the type of sequence tested. Results below show rates of low, mid and high-input learners. Further, overall results show the developmental stages of learners. I will show results in relation to each group of learners to address the question of the amount of input learners are exposed to. But there are cases where my data indicated no further progress.

The order of the figures has been changed to conform to the order in the appendix. Figure 5.1 below shows only the average scores of learners in relation to the amount of input. One can notice that high-input learners show the highest scores if compared with low and mid-input learners. This shows development kind of acquisition.

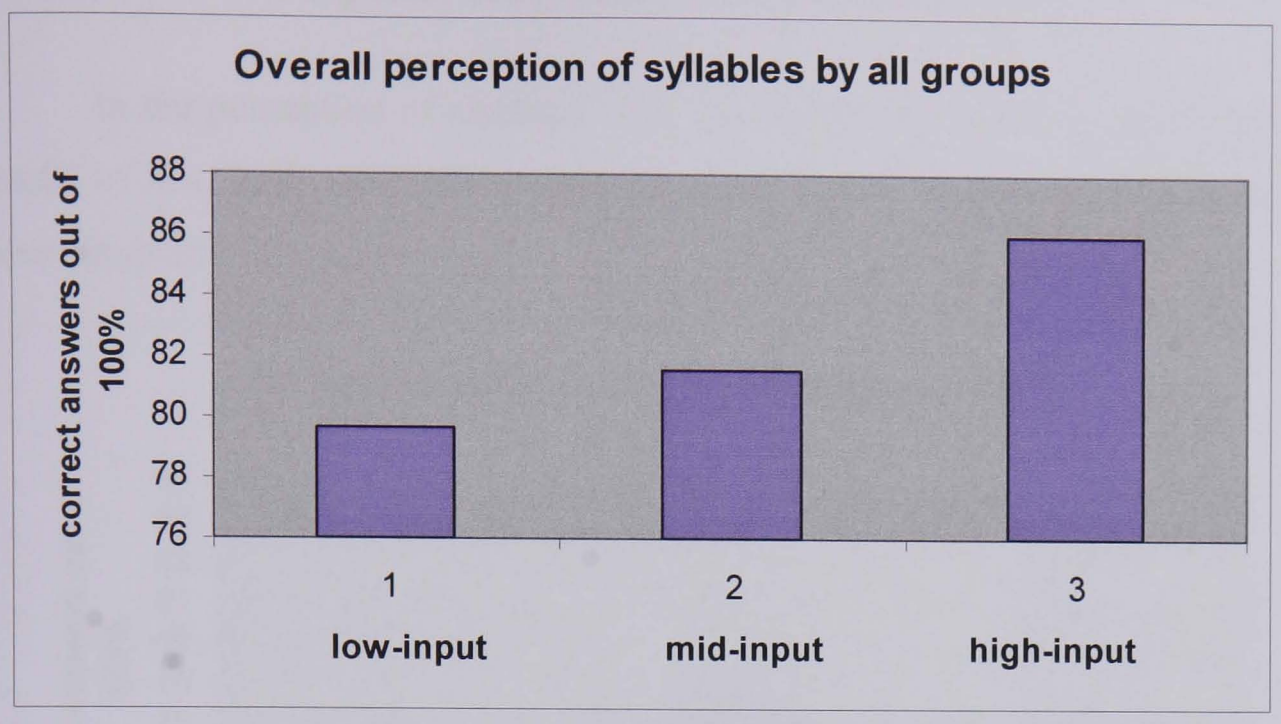

Figure 5.1

In the above figure (5.1) the standard measure shows results out of 100%. The actual scores show that the highest score in the perception of syllable by low input learners is above 80%. Most learners have high results in syllable structure. The lowest score is 70%. Thus one can notice that even low exposure learners have no problems with syllable structure.

In the case of mid-input learners the highest score in the perception of syllable is 90%. The lowest score is 65%. Most learners have high results. Thus one can notice that intermediate learners have higher results than beginners.

In the case of high-input learners, the highest score in the perception of syllable structure is 92%. The lowest score is 78%. Most learners have high results in the perception of syllable structure. (See Appendix A Figure 1,2,3). Thus we can conclude that intermediate and advanced learners have higher results if compared with beginners. This indicates that intermediate and advanced learners showed development.

As I showed overall results of syllable perception, I turn to clusters within the syllable. This is to show how learners deal with different kind of clusters and which kind of clusters are mastered by learners as they are exposed to higher amount of input. CC and CCC clusters are the tested sequences in onset and coda.

5.7.2.2 Perception of syllable structure: clusters

In the perception of clusters, both onset and coda clusters were tested to find out results of low, mid, and high input learners in acquiring clusters. The following results were obtained.

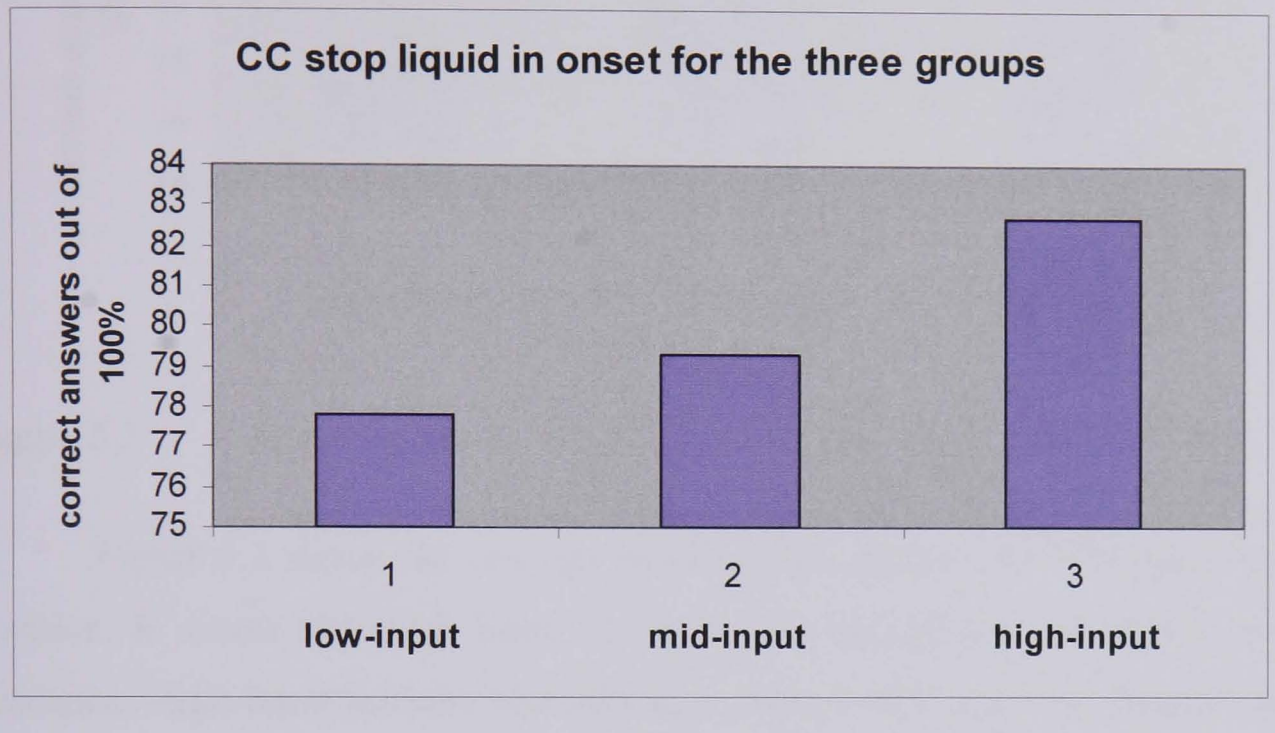

Figure 5.2

In Figure 5.2 high-input learners show the highest scores if compared with other groups of learners. Overall results of low-input learners for sequence of CC clusters of stop-liquid in onsets show that the highest score was 87%. The lowest score was 60%. Most learners had high scores for this cluster. (See Appendix B Figure 10). Results also showed scores of mid-input learners in sequence of CC clusters. These clusters include stop-liquid in onset position of a syllable. The highest score for mid-input learners was 85%. The lowest score was 62%. Most learners had high scores those were identical to low-input learners. (See appendix B Figure 11)

Overall scores for high-input learners in this sequence show that, the highest score was 90%. The lowest score was 75%. Most learners had high scores if compared with low-input and mid-input learners. (See Appendix B Figure 12)

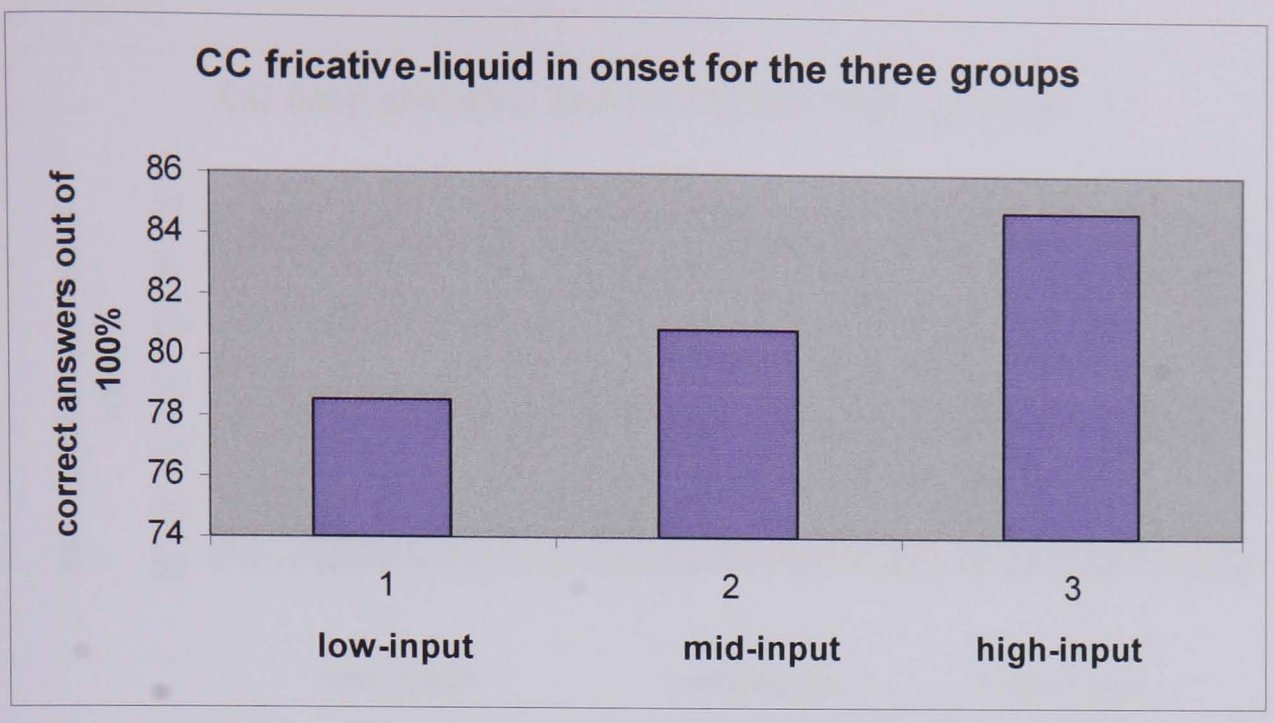

Figure 5.3

Figure 5.3 shows the average results of CC clusters with fricative-liquid in onset position. It seems that high input learners show remarkable success in mastering this sequence. High-input learners had very high scores, 90% with the highest and the lowest score was 78%. The high input learners had the highest scores if compared with low-input and mid-input learners. (See appendix B Figure 15.) Results for low-input learners indicate that the highest score was 85%. The lowest score was 70%. Most learners had high scores in perception of this class of clusters. (See Appendix B Figure 13.) Results also show scores of mid-input learners as highest score 86%. The lowest score was 71%. (See Appendix B Figure14). One can notice that mid-input learners had higher results if compared with low-input learners. Figure 5.3 above indicates that there are developmental stages in acquiring these clusters.

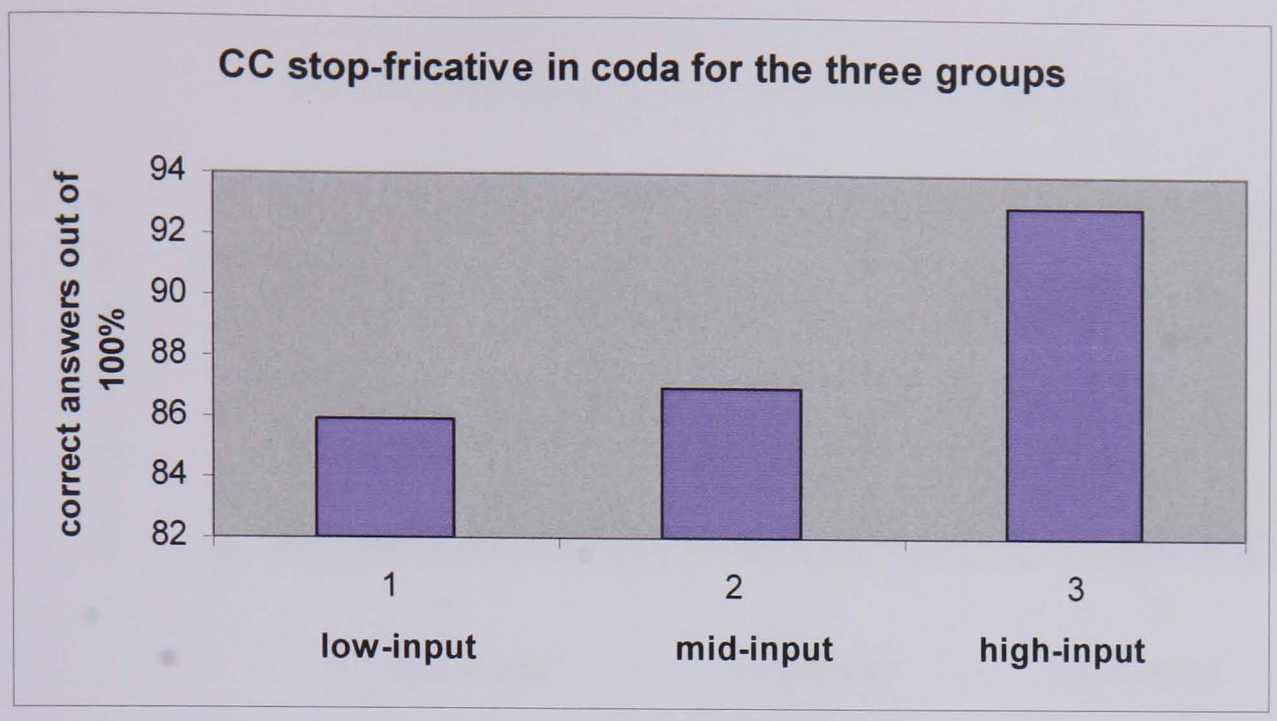

Figure 5.4

Figure 5.4 shows the average results of learners in the perception of CC stop-fricative in coda. The highest results were shown by learners with high exposure, in comparison with learners with low and mid-exposure. Overall results showed scores of low-input learners in the perception of CC clusters. These clusters include stop-fricative in coda position of a syllable. The highest score was 93%. The lowest score was 80%. Thus learners had high scores in this class of clusters. In the case of mid-input learners in the perception of CC clusters include stop-fricative in coda position. The highest score was 94%. The lowest score was 80%. It seems that mid-input learners had scores as high as high-input, and their scores were slightly higher than low-input learners. In the case of high-input learners in the perception of CC clusters, which involve stop-fricative in coda position, the highest score was 98%. The lowest score was 87%. High-input learners had higher scores than beginners and intermediate in this class of clusters. There is clear development in the case of learners as they are exposed to low, mid and high input as suggested by average results in Figure 5.4 above. These developmental processes were in the case of CC stop-fricative in coda. High input learners have higher results than other learners.

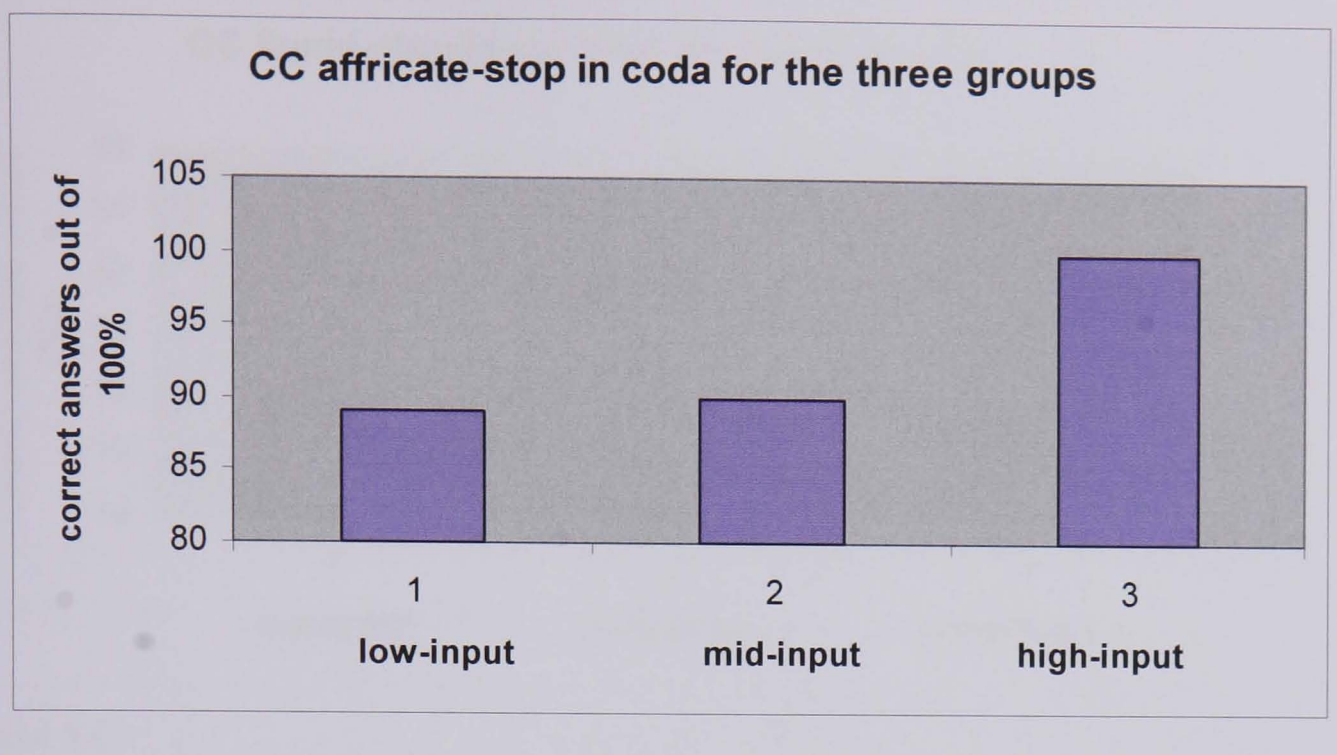

Figure 5.5

Figure 5.5 shows average results of the three groups of learners. It indicates that high-input learners had remarkable results. High input learners show development in mastery of CC affricate-stop if compared with low and mid input learners.

Overall results have shown scores of low-input learners in the perception of CC clusters. These clusters include affricate-stop in coda position. The highest score was 99%. The lowest score was 78%. Learners had high scores in this class.

In the case of mid-input learners, the highest score was 99%. The lowest score was 79%. Learners had slightly higher results than beginners. In the case of high input learners, all learners had the highest score of 99%. This indicates that high-input learners had higher results if compared with low-input and mid-input learners. As indicated on figure 5.5 above learners show development in acquiring this type of CC affricate-stop clusters. This means high input learners are native like in perception of this kind of clusters. The figure shows score of 105% to allow more spacing only. Some examples of Arabic were shown in figure 3.4 above in chapter 3.

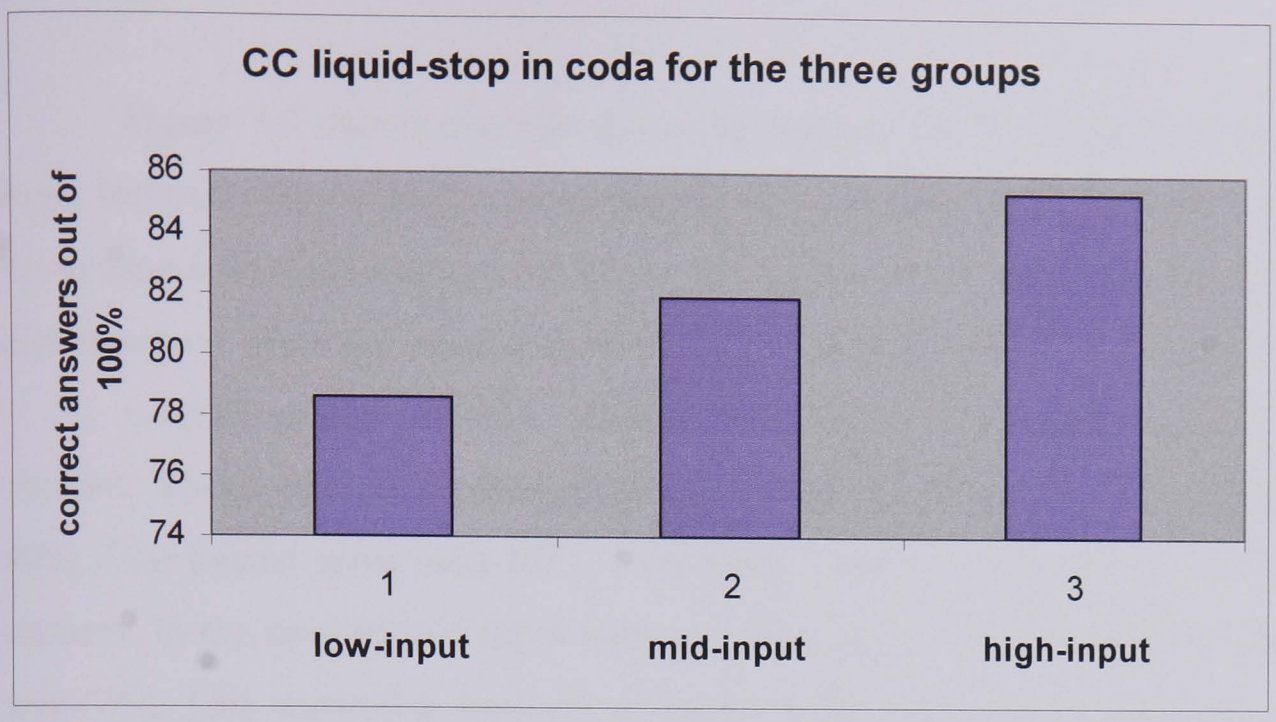

Figure 5.6

Figure 5.6 shows results of learners in perception of liquid-stop clusters in coda position. It seemed that there are upgrade results in the case of low, mid, and high-input learners. Learners show developmental stages in acquiring this cluster.

Overall results showed scores of low-input learners in the perception of liquid-stop in coda position. The highest score was 82%. The lowest score was 59%. Learners had a reasonable mastery. In the case of mid-input learners, the highest score was 90%. The lowest score was 62%. Thus learners had higher results if compared with low-input learners in mastering this class. In the case of high-input learners, the highest score was 90%. The lowest score was 70%. These learners had higher results if compared with low and mid-input learners. Thus I can notice that input has a significant role in developing learners' phonological competence.

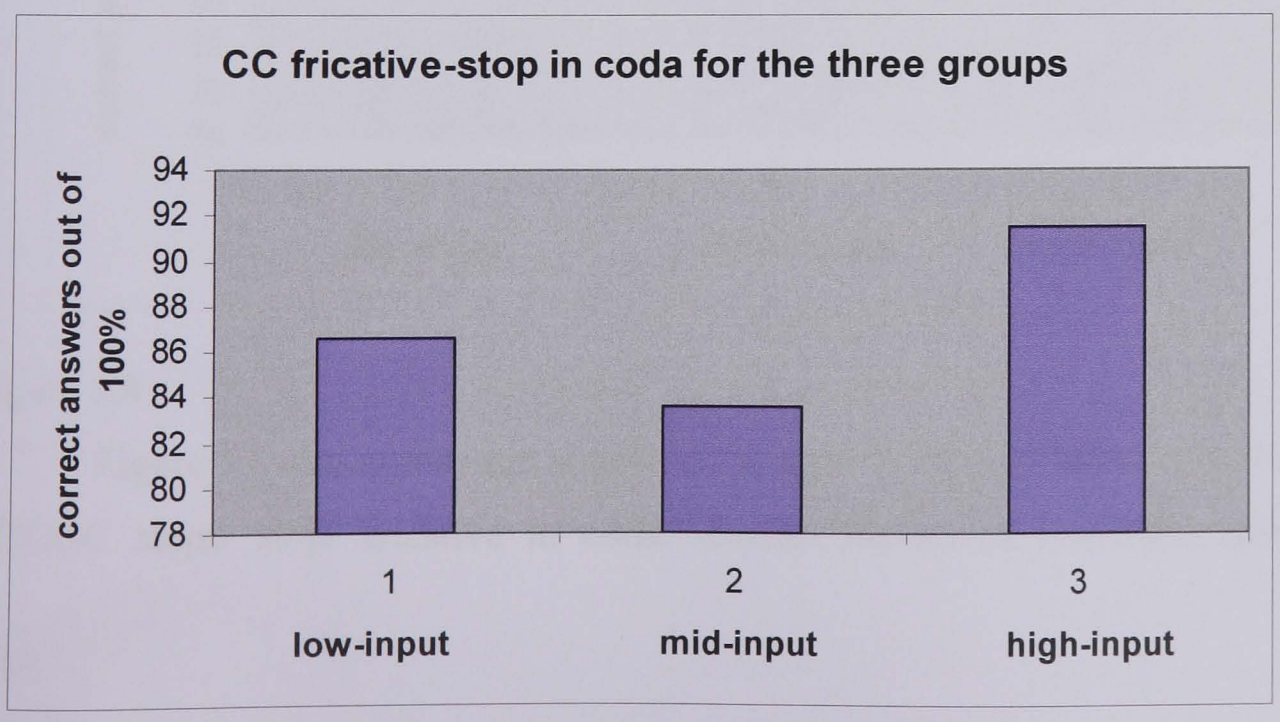

Figure 5.7

Figure 5.7 shows average scores by learners in CC fricative-stop in coda. High input learners showed high scores. However the average scores of mid-input learners is lower than low-input learners. If this is related to sonority mid input learners would have higher scores. Thus the input is more likely to affect the results than sonority.

Overall results showed scores of low-input learners in the perception of CC clusters. These clusters include fricative-stop in coda position. The highest score was 99%. The lowest score was 68%. Low-input learners had high scores in this class of clusters. In the case of mid-input learners, the highest score was 99%. The lowest score was 60%. This showed a dramatic decrease in the case of these learners. In the case of high-input learners, the highest score was 98%. The lowest score was 84%.

As shown in figure 5.7 above that there is development from low input to high input. However mid input learners show low scores if compared with low input. This point needs further research to control the actual amount of exposure and to refer to NL structure.

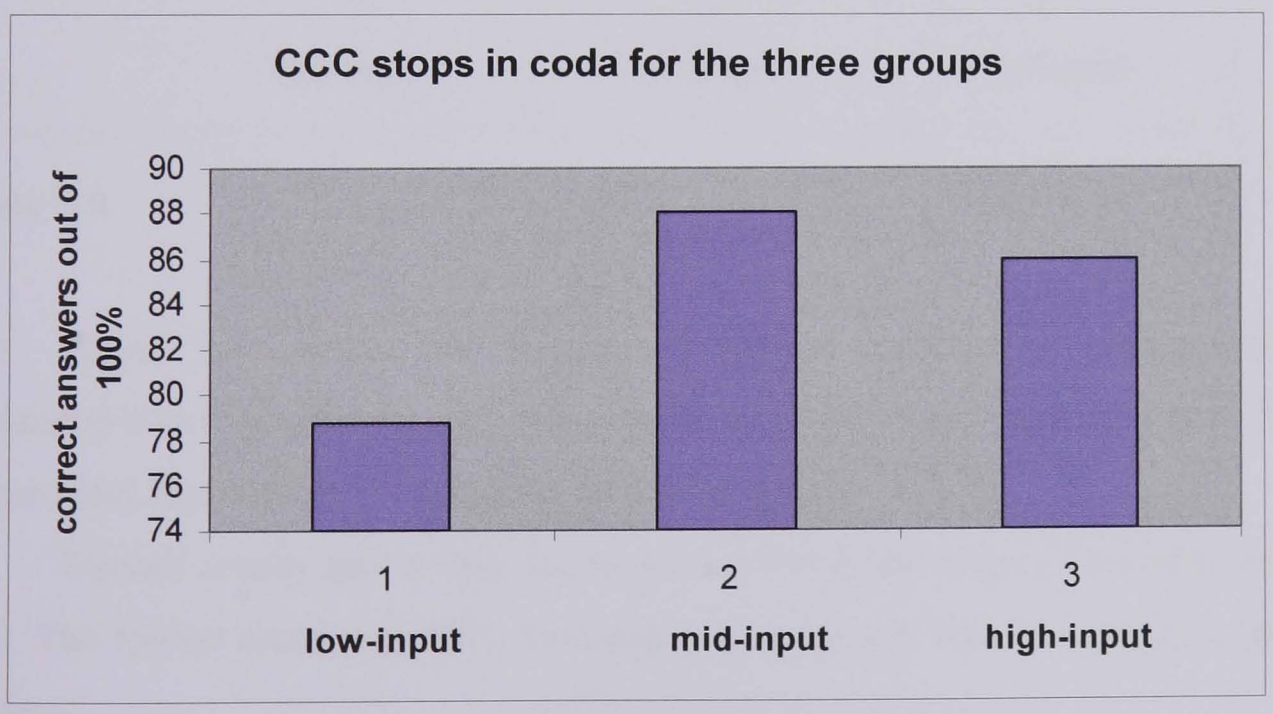

Figure 5.8

Figure 5.8 shows average scores of the three groups of learners in the perception of CCC stops/ stop/ fricative in coda. Overall results of low-input learners in the

perception of CCC clusters in coda position have shown that: the highest score was 90%. The lowest score was 60%. Results of this class are slightly higher in the case of low-input learners if compared with results of previous findings.

In the case of mid-input learners, the highest score was 90%. The lowest score was 60%. Result showed similar scores in the case of low and mid-input learners.
In the case of high-input learners, the highest score was 93%. The lowest score was 78%. Results of high-input learners are higher if compared with mid and low-input learners. However the average scores are higher in the case of mid-input than high input learners as indicated on Figure 5.8 above.

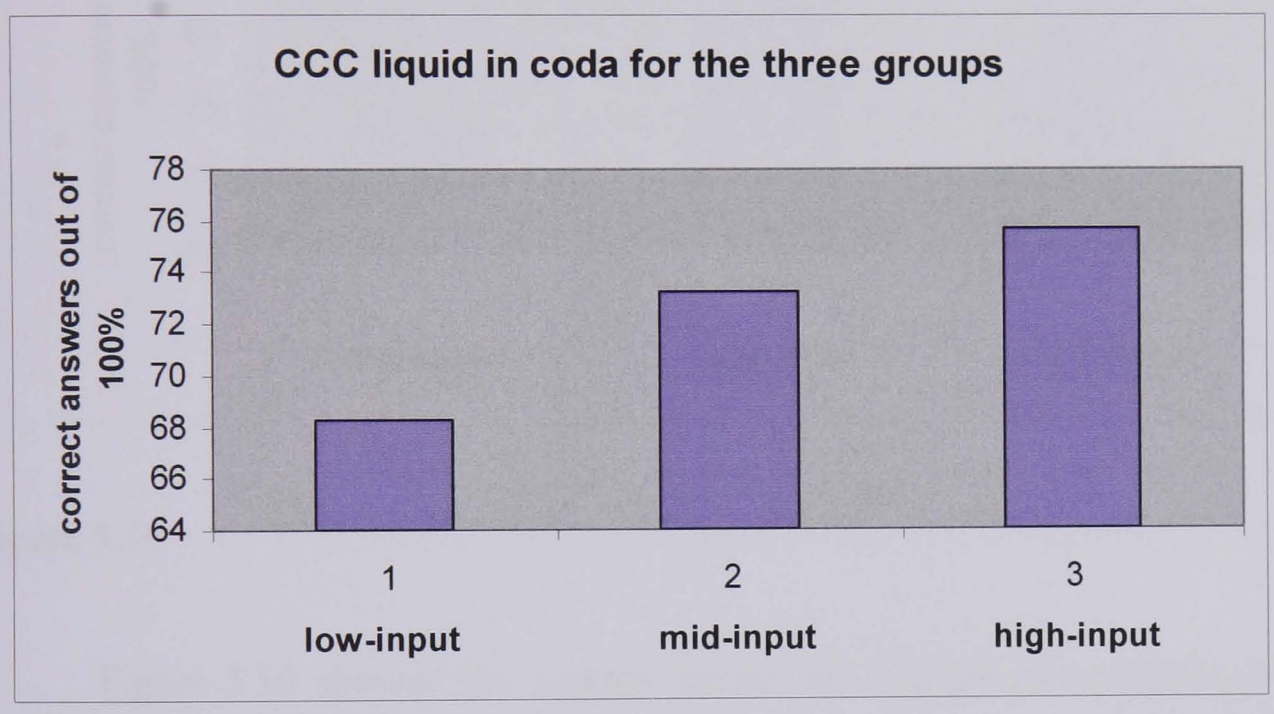

Figure 5.9

Figure 5.9 shows the average scores of learners in perception of CCC liquid/stop/fricative clusters in coda position. This figure indicates that high input learners had high results if compared with other groups.

Overall results shows that: the highest score in the case of low input learners was 81%. The lowest score was 40%. Low-input learners still had low scores in this type of clusters.

In the case of mid-input learners, the highest score was 85%. The lowest score was 39%. Thus mid-input learners had higher scores if compared with low-input learners.

In the case of high-input learners, the highest score was 87%. The lowest score was 65%. One can note that high-input learners had the highest scores if compared with low and mid-input learners.

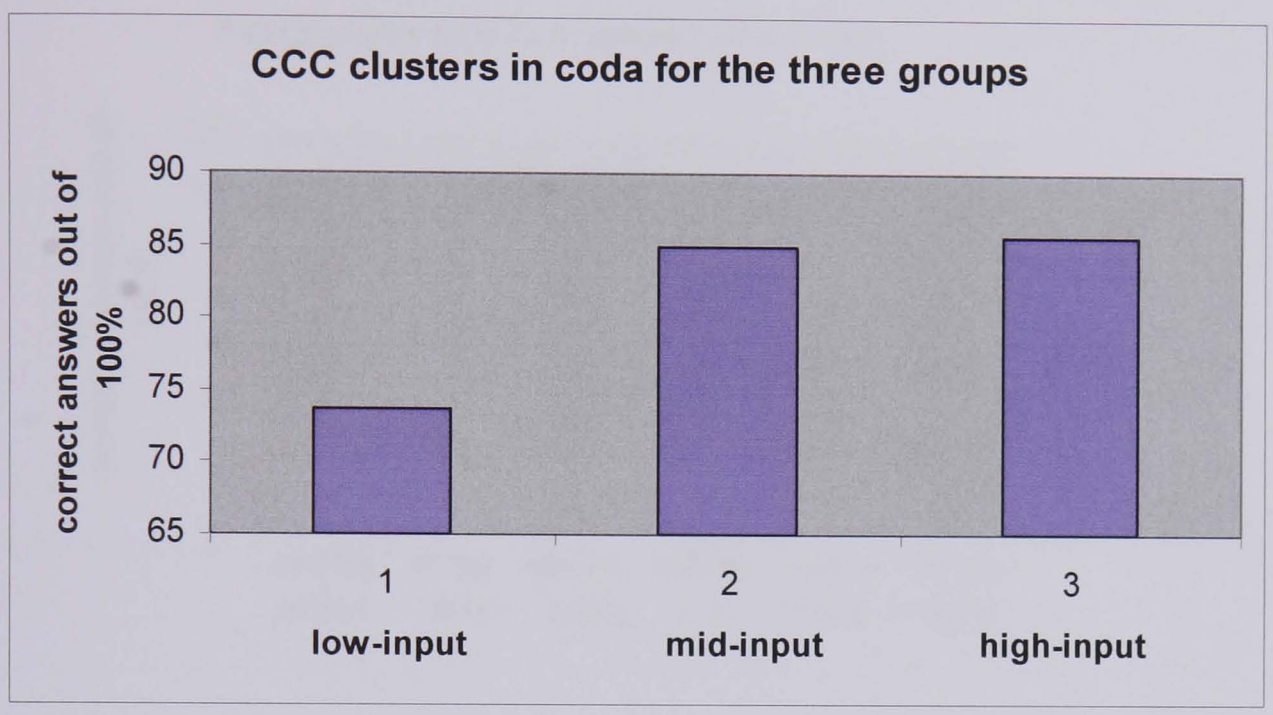

Figure 5.10

Figure 5.10 showed the average scores of CCC fricative/stop/fricative in coda. High input learners had higher results in comparison with other groups of learners.

Overall results showed scores of low-input learners in the perception of CCC clusters. These clusters include fricative in coda position. The highest score was 90%. The lowest score was 43%. Most low-input learners had scores above 65%.

In the case of mid-input learners, the highest score was 99%. The lowest score was 78%. Most of their scores were above 78%. This indicates that learners had high scores if compared with low-input learners.

In the case of high input learners, the highest score was 99%. The lowest score was 68%. This showed that high input learners had a high score. This score was similar to the highest score of mid-input learners. One can notice that low-input learners had the lowest score. High input learners were exposed to an amount of input which was longer

than low and mid-input learners. It could be that the actual hours spent with native English speakers differ from one group to the other or it might be related to the specific clusters being attempted, and their difficulty.

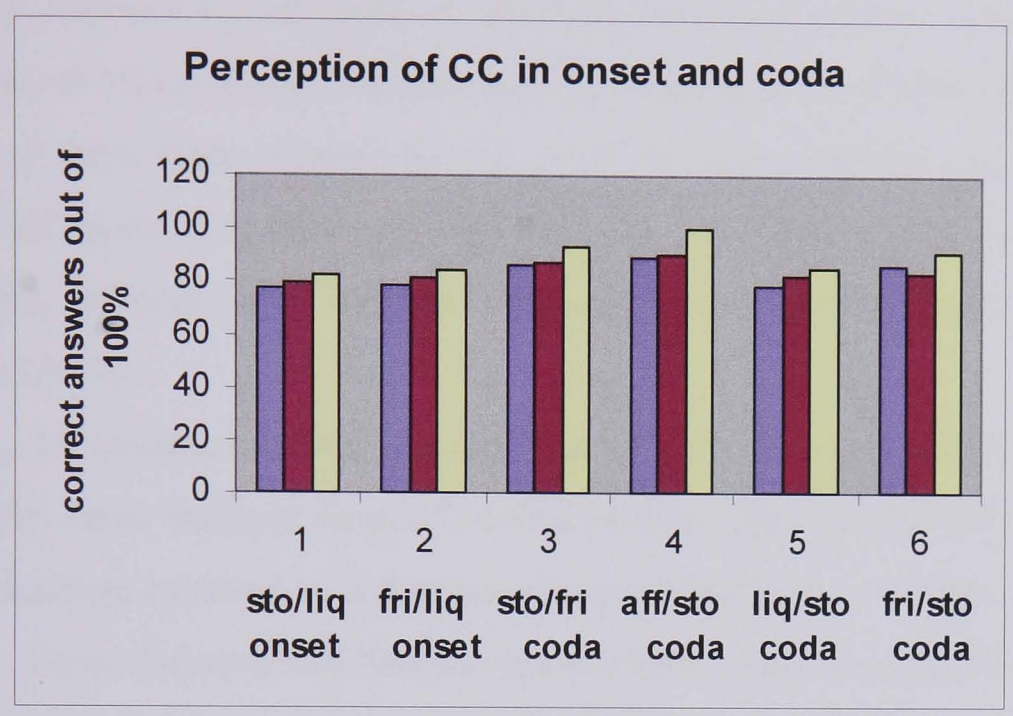

Figure 5.11

Figure 5.11 above shows scores of the three groups of learners in onsets and codas of CC clusters. It shows that learners have higher results in CC stop fricative and CC affricate stop in codas than other types of clusters. They also have lower scores in liquid stop and fricative stop in coda. The figure shows 120% to allow more spacing, the actual highest score was 90%, out of a possible 100%.

My study concentrates on the factor of exposure as operationalized as years of residence in the UK. In analyzing my results, I did not focus on age, as all learners were past the age of puberty when they arrived in the UK, and they were all roughly the same age when they were first exposed to English in Libya. I also did not include an overall figure for CCC clusters in general because all specific results are shown in figures related

to CCC clusters in isolation. Despite the fact that learners seemed to be in-consistent with their scores in regard to clusters, overall results of individual learners in relation to the amount of input, show that, in sequence of CC clusters includes stop-liquid in onset position of a syllable, two learners had high scores in this class of cluster. Their scores were above 90%. Although one learner was exposed to 3-5 years of input and the other learner exposed to 1-2 years of input, this class of cluster seemed to increase with the amount of input. Three learners had the same scores of 84% despite amounts of input. Two of them were exposed to 1-2 years of input whereas one of them exposed to 3-5 years of input. Yet they had the same scores. Thus I can conclude that in acquiring clusters, learners show different rate of mastery despite their exposure. See Appendix B10,11&12).

In sequence of CC cluster that includes fricative-liquid in onset position of a syllable, three learners showed similar results. They scored 89% in this class of cluster. Two learners exposed to 3-5 years of input whereas one of them exposed to 1-2 years of input. Those learners still had the same results. Thus one can say that acquisition of this type of cluster doesn't increase with the amount of input. Complete mastery was not obvious in this case. The highest scores were shown in the case of high-input and mid-input learners. (See Appendix B 13, 14,&15).

For CC affricates in onset position, most learners showed complete mastery over this type of cluster; learners with 1-2 years of exposure showed similar results with learners of 3-5 years of input. This indicates that there is a certain period when clusters mastered. With learners from 1-2 years of exposure to TL accented input, learners can perceive these clusters like native speakers of the TL.

Regarding results of CC liquid-stop in coda position; most learners scored above 80%. One learner had 62% with exposure to 1-2 years of input. In regard to the amount of input, learners show fairly high mastery over this cluster. See Appendix B 21, 22, & 23).

In the case of CC clusters where this includes affricates in coda position above, most learners show a complete mastery over this kind of cluster. However, this cluster caused less problems for learners. Three learners had lowest scores; two of them were

exposed to 1-2 years of input whereas one of them was exposed to weeks of input. Still they had similar scores of 75%. (See Appendix B19&20).

For CC clusters of liquid-stop in coda position, learners did not show complete mastery over this kind of cluster. Furthermore learners with only weeks of TL input in the UK and those with 1-2 years of input scored similarly. This could be attributed learners' first language. (See Appendix B 21& 22)

For results of CCC clusters with stops in coda position, learners had high scores. It seems that learners showed a reasonable mastery over this kind of cluster. Two learners with months of input had high scores. Their scores were 85%. See Appendix B 27, 28 & 29).

In CCC clusters of liquid in coda position, most learners had scores below 80%. Two learners showed lower scores despite of the amount of input. One of them was exposed to 1-2 years of input. The other one was exposed only to months of input. For CCC cluster of fricative, most learners had scores above 80%. However, learners who had 3-5 years of input, showed high mastery. (See Appendix B 30, 31&32).

The fact is some learners with 1-2 years of input showed similar results with learners of 3-5 years of input. This is shown in the questionnaire which was given to learners to find out their engagement with native speakers. Most learners with 3-5 years of exposure had less access to native language accentuation system. Their interaction with native speakers is limited to work only. In the case of my subjects more control over the actual amount of input is required in future research as indicated earlier.

Data from the perception study of syllable structure suggest that Libyan learners of English who have received years of primarily foreign accented input can improve their perception of syllable structure of an L2 once they are in the target language setting and exposed to native accented input.

Our discussion of clusters is related to English words containing consonant clusters of bi-literal clusters in initial and final positions and tri-literal clusters word finally. The lack of difficulty with final bilateral clusters may be attributed to the fact that Arabic MSA and LA, the L1 of our learners, allow this kind of consonant clusters word finally as explained in (cf. 3.3.3 and 3.3.4 above) Our learners were familiar with these clusters. Thus more research is required here.

On the other hand, the same sequences word initially showed little difficulty. This is very remarkable, because it seems that my learners' perception is not controlled by Arabic syllable structure which outlaws such combinations in that position. One can say that the few errors in the perception of this type of English syllable structure can be considered as an indication that learners are developing towards the norm of the TL.

Three consonant clusters seemed to be the most difficult type for our learners. This kind of cluster in all different position represents higher error percentage than that of bi-literal clusters. Thus we can conclude that bi-literal clusters have been acquired by our learners whereas tri-literal ones have not been acquired as native like yet. This is in the case of results of high input learners in comparison with other groups of learners. Strategies for dealing with clusters are epenthesis and cluster reduction. This finding is in line with other studies. As they indicated that epenthesis is a major strategy used by L2 learners to eliminate word final consonants and reduce consonant clusters. (Broselow 1987; Tarone 1980, among others).

Rating transfer errors by learners in perception of clusters in various positions, I found that, in the perception of CC clusters in onset position, learners seem to have problems with plosive liquid clusters in initial position and they prefer iCC and not CiC. They perceive epenthesis in the following cases of clusters. These clusters are taken from overall results of learners: pl/bl/gl/kl/gr/pr/kr/. The following examples are the most repeated errors of all learners. See (9) below:

(9)

Example		Error rate
Play	iplay	28%
Blue	iblue	31%
Glass	iglass	25%
Clear	iclear	21%
Green	igreen	25%
Pry	ipry	21%
Crap	icrap	25%

Learners seemed to prefer epenthesis before clusters. Their phonological competence is shaped by rules of their LA. If they applied rules of MSA they preferred CiC where the epenthesis appeared between clusters and not before them. Thus LA seems to be in operation first.

S clusters are problematic in the sequence of: sp/st/sk/sm/sn/. Learners preferred epenthesis in initial position. They did not break the clusters. Again one can notice that learners apply rules of LA and not MSA. They perceived iCC and not CiC. See (10) below:

(10)

Example		Error rate
Spell	ispell	10%
Still	istill	15%
Skew	iskew	10%
Small	ismall	21%
Snow	isnow	26%

CCC clusters in the onset also cause problems for learners. The following sequences are problematic: spr/skr/str/spl/ see (11) below. Learners seemed to perceive non-grammatical forms as grammatical in the sense that they could not realize the differences between the forms that have epenthesis and forms that do not. Thus they misperceive identical and non-identical forms.

(11)

Example		Error rate
Spring	ispring	15%
Screw	iscrew	34%
Street	istreet	15%
Split	isplit	19%

Learners seem to have problems with CC in the coda. They perceive CiC form and not CCi or iCC. Their problems were clear in the following sequences: lt/lv/rl/rg/rf/rv/rd/ts/st/ks/ps/bs/gz/ see (12) below. My study did not determine whether learners were exposed to different varieties of English in reference to the [r] sound, although it can be assumed that they had had some exposure to American English in Libya and also from television in the UK.

Despite the fact that CC in the coda exists in Arabic in MSA and LA, learners still have difficulty in perception of CC clusters in coda. One can attribute this to the fact that there are other developmental processes which are not related to first and second language structure but which are linked to some universal principle. Thus the structure of CVCC syllable is transferred to the form CVCVC. See Young-Scholten and Archibald (2000).

(12)

Example		Error rate
quilt	quilit	28%
twelve	twelive	18%
Scarf	scarif	18%
Serve	serive	34%
Word	worid	21%
Cats	catis	6%
Nest	nesit	25%
Books	bookis	18%
Gaps	gapis	9%
tabs	tabis	3%
Eggs	eggis	15%

In final position of CCC clusters, learners perceive CiCC or CCiC and not CiCiC. This indicates that they are at advanced stage of acquiring target language CCC sequence.

The following combinations cause some problems: lks/lbz/ldz/lnz/fts/nks/sks/lts/ see (13) below.

CCC clusters appear to be perceived of as a combination of C and CC, thus the breaking of this cluster yields a kind of developmental rule. This rule reads as CiCC >CCC and not CiCiCi >CCC. The insertion of a vowel to simplify the clusters is preferable by our learners.

(13)

Example		Error rate
milks	miliks	18%
bulbs	bulibs	37%
holds	holids	28%
kilns	kilins	56%
rafts	rafits	21%
links	liniks	50%
asks	asiks	46%
results	resulits	34%

In summary, learners of the three levels showed developmental stages in acquiring clusters in onset and coda as explained by figures 5.2-5.10 above. However their mastery differs according to the type and sequence of clusters. Results also showed that transfer errors are obvious in perception of iCC clusters. This could be due to transfer of L1 structures into L2.

5.7.2.3 Perception of stress

In the perception of stress, results show perception of stress in isolation and perception of stress in sentence. Then they show the grammatical and non-grammatical forms of stress through comparison to a native speaker of English. A native speaker of English read grammatical and non-grammatical forms of stress on tape and subjects had to listen and mark which was correct on an answer sheet.

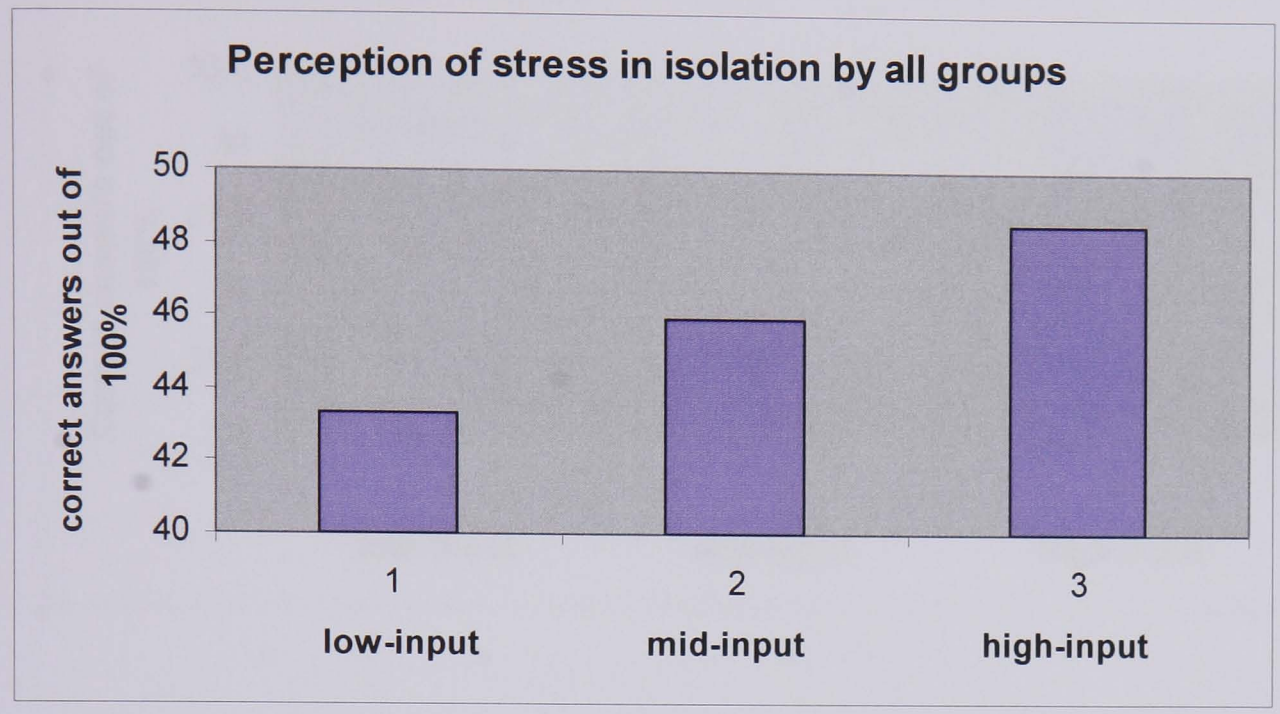

Figure 5.12

Figure 5.12 shows the average scores of learners in relation to the amount of input in the perception of stress in isolation. One can notice that high-input learners show the highest scores if compared with low and mid input learners.

Results show that the highest score in the perception of stress in isolation by low-input learners was 50%. The lowest score was 32%. Most low-input learners had low results in stress in isolation. This indicates that stress is not mastered by learners with little TL exposure.

The highest score in the perception of stress in isolation by mid-input learners is 61%. The lowest score is 13%. Most mid-input learners had low results in the perception of stress in isolation. This goes in line with results of low-input, as their results have shown low results. Thus learners with low and mid exposure have not mastered stress yet.

The highest score in the perception of stress in isolation by high-input learners was 61%. The lowest score was 31%. Most learners had low results in stress in isolation. Thus I can conclude that learners do not master stress in isolation yet with up to 3-5 years of input.

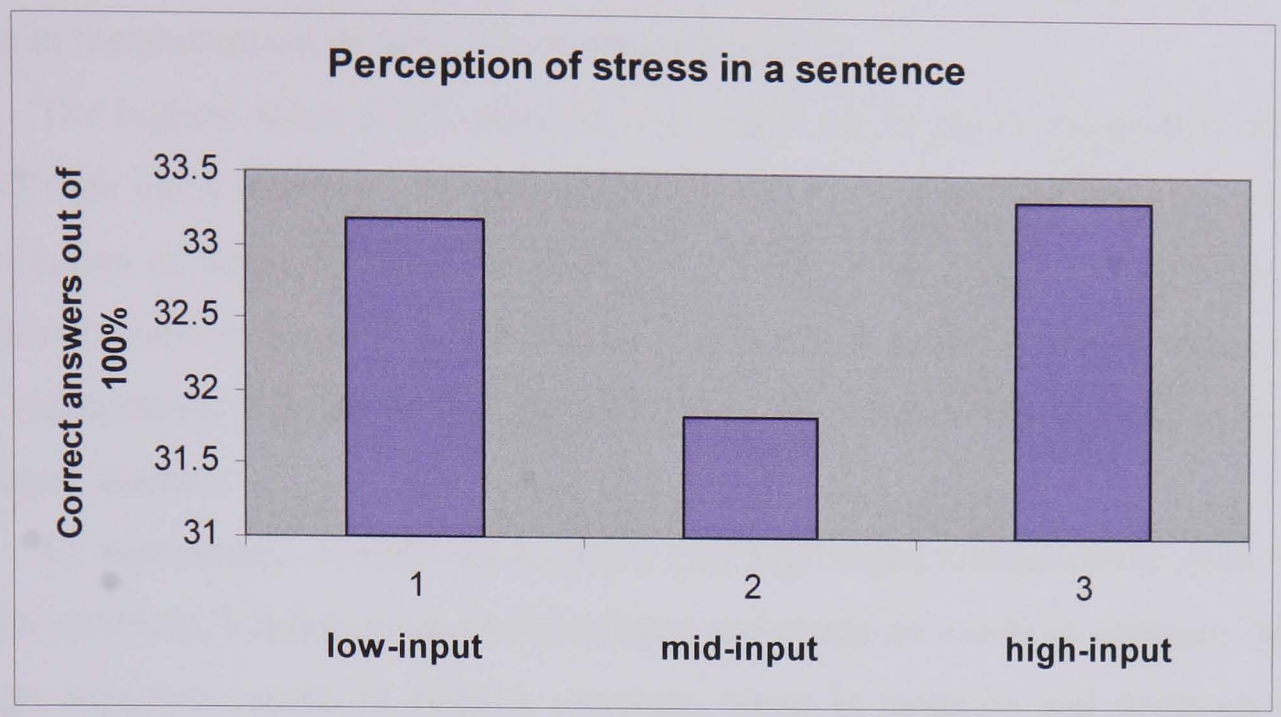

Figure 5.13

Figure 5.13 shows perception of stress in a sentence by the three groups of learners. The average scores of mid input learners showed low results. This indicates that learners have not mastered the perception of stress in a sentence. However high-input learners had higher results than mid-input learners and low input learners. I expect mid input learners to have higher results than low input learners but there is some evidence where I can postulate that from 1-2 years of input learners can not master stress in a sentence. This result go in line with Archibald (1998) in that learners are guided by transfer errors and developmental errors related to their level. In this case my subjects are guided by developmental processes. Learners have high error rate as they are exposed to mid-input.

Results show that the highest score in the perception of stress on words in sentence by low-input learners was 42%. The lowest score was 15%. Most low-input learners have very low results. This leads to the conclusion that stress on words in sentence is acquired but it needs high amount of input.

The highest score in the perception of stress on words in a sentence by mid-input learners was 49%. The lowest score is 20%. Most mid-input learners have very low results in the perception of stress on words in sentence.

The highest score in the perception of stress on words in sentence is 45% in the case of high input learners. The lowest score is 19%. Most learners had very low results in perception of stress on words in sentence. Learners with low, mid, and high input do not show mastery over stress in a sentence. It is possible that learners fossilized at certain time. Furthermore it could be that the actual amount of input was reduced in the case of high input learners.

To summarize, overall results show that high-input learners have high results in syllable structure, but not on stress in isolation and stress on words in sentence. Mid-input learners have low results in syllable structure, stress in isolation and stress on words in sentence if compared with high-input learners. Low-input learners, on the other hand, have very low results if compared with mid-input learners and high input learners. This leads to the conclusion that the acquisition of syllable in L2 acquired before stress. The acquisition of stress in the case of all three groups shows less mastery. High input learners show higher results than mid and low input learners. This indicates that learners are developing towards the acquisition of syllable and stress.

I tested learners' perception of stress in grammatical and non-grammatical forms. In grammatical forms of stress, the stress is on the correct syllable whereas in non-grammatical forms, stress is shifted to yield incorrect form. (cf.4.3.1.3 above) Results showed that there are some variations among classes of stress in regard to the amount of input.

The table 5.3 below shows the rejection of grammatical forms of stress. These indicate that learners are missetting some parameters. Error rate of each class by low, mid and high-input learners.[4]

[4] Mis-perception of grammatical forms of stress indicates errors of learners.

Table 5.3 Grammatical forms of stress

	Low-input	Mid-input	High-input
Class I	41%	52%	40%
Class II	72%	40%	60%
Class III	59%	47%	20%
Class IV	56%	35%	45%
Class V	62%	65%	50%
Class VI	50%	60%	60%
Class VII	69%	52%	90%

The table (5.4) below shows the acceptance of ungrammatical forms of stress. This also shows that learners have not set the parameters of TL. Error rate of each class by low, mid and high-input learners.

Table 5.4 Ungrammatical forms of stress

	Low-input	Mid-input	High-input
Class I	75%	72%	48%
Class II	61%	60%	60%
Class III	63%	64%	70%
Class IV	58%	68%	66%
Class V	72%	71%	73%
Class VI	67%	57%	75%
Class VII	69%	64%	78%

The table 5.5 below shows lowest and highest error rates of grammatical forms of stress. The average scores show decline in error rate in the case of low and mid input learners only.

Table 5.5 Error rates of grammatical stress

	Low-input	Mid-input	High-input
Highest	72% class II	65% class V	90% class VII
Lowest	41% class I	35% class IV	20% class III
Average	59%	50%	52%

The table 5.6 below shows lowest and highest error rates of ungrammatical forms of stress. The average scores show decline of error rate from low input to high input learners.

Table 5.6 Error rates of ungrammatical forms of stress

	Low-input	Mid-input	High-input
Highest	75% class I	72% class I	78% class VII
Lowest	58% class IV	57% class VI	48% class I
Average	66%	65%	67%

As indicated in table 5.4 above, learners show different rate of mastery depend on the type of class:

I-Results show that, for nouns with penultimate stress which contain a tense vowel in the penultimate syllable and where the final syllable always contains a lax vowel i.e. aroma, arena, horizon, we find the lowest error rate of 41% in the case of low-input learners as they perceived grammatical forms of stress as correct. In the perception of ungrammatical forms, the error rate was very high by low-input learners in this class, it was 75%, and 72% in the case of mid-input learners. The lowest error rate is also shown in this class by high-input learners of 48% in the perception of ungrammatical forms. This class shows improvement and one can interpret this kind to L1 structure.

II-For nouns with penultimate branching rime i.e.agenda, appendix, synopsis. The highest error rate of 72% in the perception of grammatical forms was by low-input learners. Error rate was less in the case of mid and high input learners.

III-Nouns with antepenultimate stress, where the penults have neither tense vowels nor consonant clusters to attract the stress, and the final syllable always contains a lax vowel. i.e. cinema, vension, America. It has the lowest error rate of 20% in the case of high-input learners in the perception of grammatical forms of stress.

IV-Verbs with final stress, tense vowels in the final syllable which trigger quantity sensitivity of English and attract the stress i.e. maintain, appear, decide. It has the lowest error rate of 35% in the case of mid-input learners, in the perception of grammatical forms of stress. It also has the lowest error rate of 58% in the case of low-input learners in the perception of ungrammatical forms.

V-Verbs with final stress, they are with consonant clusters in the final syllable which trigger the quantity sensitivity of English and attract stress i.e. elect, adapt. This type has the highest error rate of 65% in the case of mid-input learners when they perceive the grammatical forms of stress.

VI-Verbs with penultimate stress where the final syllables contain neither tense vowels nor consonant clusters to attract stress i.e. edit, cancel, consider. This type has the lowest error rate of 57% in the case of mid-input learners, in the perception of ungrammatical forms.

VII-Nouns which have tense vowels in the final syllable and have secondary final stress with main stress on the antepenult as the penults are neither closed nor contain tense vowels i.e. hurricane, candidate, matador, have the highest rate of 90% in the case of high-input learners in the perception of grammatical forms of stress. In the perception of ungrammatical forms, the highest error rate is shown in this class as 78% in the case of high-input learners.

Low-input learners showed an average of 59% in miss-perception of grammatical forms of stress. This result is not in line with the mid-input learners who showed an average of 50%. On the other hand high-input learners showed an average of 52% which is slightly higher than mid-input. These results did not show development stages in relation to groups of learners which indicate that each type acquired independently.

In the perception of ungrammatical forms of stress similar results were obtained. In the case of low-input learners, the average of error rate was 66%. Whereas in the case of mid-input learners, it was 65% and in the case of high-input it was 67%. One can notice that error rate is higher in later stages. I can interpret these results in terms of mis-setting parameters. Learners did not acquire these types of stress despite their amount of exposure.

One expects learners to have fewer problems with stress that is similar to their L1 and a higher error rate with stress which differs from their L1. However different results were obtained. In the perception of grammatical forms of stress, low-input learners had highest error rate in noun with penultimate stress which have tense vowel.(class II), mid-input learners had the highest error rate in verbs with final stress which have consonant in the final syllable (class V) whereas high-input learners had the highest error rate in noun with secondary stress (class VII).

It is also clear that in the perception of grammatical forms of stress, the lowest error rate in the case of low-input learners was in nouns with penultimate stress which have a tense vowel. (class I), mid-input learners showed lowest error rate in verbs with final stress which have tense vowel in final syllable (class IV), whereas high-input learners had the lowest error rate in nouns with antepenultimate stress which have neither a tense vowel nor CC to attract stress (class III).

In the perception of ungrammatical forms of stress, low and mid-input learners had highest error rate in noun with penultimate stress which have tense vowel (class I), whereas high input learners had highest error rate in noun with secondary stress (class VII).

The lowest error rate was shown by low-input learners in verbs with final stress which have a tense vowel in final syllable (class IV). Contrary to mid-input learners who showed the lowest error rate in verb penultimate stress which contain neither tense vowels nor CCs (class VI). In the case of high-input learners the lowest error rate was in class I.

In the perception of grammatical forms of stress learners showed improvement, as can be seen in classes I –VI. These results were shown by low, mid and high-input learners, as learners started with a high error rate and gradually ended with a low error rate in the case of high-input learners. However results of ungrammatical forms have shown improvement in classes I and II only. The other classes, III-VII, have shown no improvement.

The testing words in class IV take final stress in English. If we apply Arabic rules of stress placement to these words we would also derive final stress. This is because the final syllable is considered superheavy and must receive the primary stress in the word. Thus if our learners transfer their L1 rule into L2 they would correctly assign final stress to class IV.

In class I and II, all words contain stressed penults. If learners apply the parameter setting of Arabic they will assign the primary stress to the heavy penults. However learners made many errors in perceiving the stress to be on the final syllable. These errors were not due to interference from L1 parameters settings. Thus learners are setting parameters which can be in line with other learners' results as in Youssef and Mazurkewich (1997).

The overall percentage of correct answers in classes' I-VI indicates that the performance of the three groups improved gradually. There was a difference in the perception of non-grammatical forms of stress with different classes.

In class III, all words are nouns with antepenultimate stress. This class is an exception to the English rule as the penults have neither tense vowel nor consonant

clusters to attract stress. Thus I expect my learners to have difficulty with this class of words. However learners showed development as they started with high errors of perceiving stress on the penultimate and final syllable in the case of low-input learners. Then they reduced their error to 20% in the case of high-input learners where they started to perceive antepenultimate stress.

When results of syllables compared with results of stress in general, data from the perception study of stress suggest that stress perception was lower in comparison with perception of syllable structure. Learners got high scores in the perception of stress at the word level in comparison with sentence stress level. This finding was not in line with Youssef and Mazurkewich (1998) whose subjects performed better in sentence task when compared with word tasks.

Learners seemed to have problems with stress in general, although low-input learners had low scores when compared with mid and high-input learners. The highest score in the case of low-input learners was 50% , the lowest score was 37%, whereas the highest scores in the case of mid-input learners was 60%, the lowest scores was 17%, and the highest scores in the case of high-input was 60%, the lowest scores was 37%. Low-input learners had average scores of 43%, the mid-input learners had an average of 38% whereas high-input learners had an average of 48%. Learners with high exposure show the highest rate. The average of high input learners shows developmental stages.

It seems that learners are still transferring their first language rules; developmental stages are less apparent in stress in isolation. In relation to the level of learners, low-input learners seemed to follow transfer from their first language whereas other learners apply some developmental stages in their interlanguage of stress in isolation. As they show higher results. These results were based on correct answers to show the rate of mastery and to compare them with other groups. Thus one can argue that transfer errors and developmental errors are related to the amount of exposure. This means that low input learners show transfer errors more often than other groups of learners.

Learners had low scores in sentence stress when compared with stress in isolation. All scores were below 50%. This indicates that their perception is under the effect of first language parameter settings and that the target language has weak role. In other words,

the input has little effect on the perception of sentence stress with all learners. The lowest scores were 17% in the case of low-input learners, in the case of mid-input learners and high-input learners it was 18%. The average scores were 33% in the case of low-input learners and in the case of mid and high-input learners it was 34%. However the stress on words in sentence is calculated in the basis of correct answers to show developmental stages. Errors of perception of stress on words in sentences were not taken into consideration; I refer to them to explain some points in relation to stress classes. Any unfamiliarity with test words would still support my results in favour of learners using a system rather than learning stress on each word.

In the perception of syllable and stress, low-input learners' performance could be interpreted as overall upward results in syllable structure. (See Appendix A figure 1) The highest score was just above 80%. Syllable structure showed high results when compared with stress in isolation and stress on words in sentence. For stress in isolation and stress on words in sentence, however, learners showed dramatically lower scores if compared with syllable structure results. Their scores were below 48%.

The average scores in the case of low-input learners are 43% in stress in isolation and 33% in sentence stress. In the case of mid-input learners, results of syllable structure are higher than stress in isolation and stress on words in sentence. The average scores are 45% in stress in isolation and 31% in sentence stress. This indicates that there are developmental stages in perception of stress. For syllable structure mid-input learners score above 80%. This shows high results similar to beginners. Overall results show that syllable structure can be acquired easily whereas stress acquires at late stages. This means that syllable structure requires low amount of input whereas stress requires high amount of input. This is obvious in high scores of syllable if compared with scores of stress in general. Although stress results are very low but it seemed that high input learners scored higher.

High-input learners show an average of 48% for stress in isolation and 33% for stress on words in sentence. Their average score of syllable structure is 86% with the highest score 90%. There is a developmental process in the case of high-input learners if compared with low and mid-input learners.

5.7.3 Results of production tests

Results of production tasks include the production of clusters within a syllable and the stress in isolation and in sentence.

5.7.3.1 Syllable structure

Error of syllable involves the breaking of consonants clusters in English by Libyan learners. They transform English strings into pronounceable Libyan Arabic syllables. Libyan learners attempting to speak English often encounter words containing syllables of more consonants clusters than would be permitted in Arabic. The second error in the speech of Arabic learners of English shows another kind of prosodic mismatch between the two languages. Libyan learners typically alter the shape of the word either by producing a geminate consonant in the final position or by lengthening the vowel. These errors can be attributed to a mismatch between constraints on the prosodic structure of words in English and Arabic, as stated by Broselow (1988). I will concentrate on syllable clusters, onset and coda.

5.7.3.2 Syllable structure: clusters

In regard to clusters within the syllable, learners with years of non-native accented input can improve their phonology when they are exposed to native speaker accented input. My data from production study showed that learners exhibited changes over time. All learners showed improvement as they use no epenthesis in onset and coda in English.

One point needs to be mentioned here, is that, in Arabic, learners did not produce CC type rather they break this clusters by epenthesis. This was obvious when they were tested in producing Arabic syllables contained CC initially and finally. Results indicated that learners did not apply rules of L1 but they are controlled by other principle such as sonority distance. One can conclude that transfer of L1 rule was not followed by our learners but there were some universal type of strategy. Further I can say that there is a

development in acquiring clusters. If learners transfer rules of L1 they would have applied epenthesis in producing clusters as shown in figure 3.4 above in chapter 3. Rather than that learners produced English clusters without epenthesis, specifically in the case of mid and high input learners.

In production of clusters, I present data from the three groups of learners, table 5.2, division 3b, to show the significant remarks with examples related to each clusters. The production of CC clusters in initial position was mastered by learners. They didn't show the use of epenthesis in the production of this kind of cluster. They produced most commonly sequences of stop-liquid, fricative-stop and fricative-nasal as in pl/kl/ /dr/br/pr/ kr/tr/ /st/sk/sm/. These clusters were taken from transcription data of production. Table 5.7 below shows the production of clusters in the case of low, mid and high input learners. There was variation among types of clusters if compared with level of learners. Mid input learners had higher scores in producing the three types of clusters than other groups, although the highest score was still quite low, at 31%.

Table 5.7 Target onset production.

	Stop-Liquid	Fricative-stop	Fricative- nasal
Low-input	(51/200) 25%	(34/200) 17%	(25/200) 12%
Mid-input	(69/250) 27%	(46/250) 18%	(34/250) 13%
High-input	(39/125) 31%	(26/125) 20%	(19/125) 15%

Learners of the three levels show increasing control over CC cluster production of different sorts. In general, data transcribed showed no epenthesis in initial position table 5.2, division 3b above. This leads to the conclusion that learners are applying developmental kind of processes. Although Broselow and Finer (1991) applied their results to sonority distance to show the rule governed clusters. I found out that there are some developmental stages in learning some clusters as learners deleting the vowel and producing no epenthesis within clusters at late stages. As explained earlier that Arabic speakers used epenthesis in the production of Arabic clusters, they did not use it in

producing English. Here I applied the correct production of clusters as process of acquiring after exposure to TL accentuation. The developmental processes appeared in the production of clusters without epenthesis. As I have mentioned that Libyan learners use epenthesis to break clusters of their native language. But as they are exposed to English accentuation they produce the correct clusters of English. Learners of low, mid and high amount of input showed no epenthesis when they are tested in describing pictures.

Broselow (1987) noted that in clusters that violated the sonority sequence, Arabic speakers inserted the epenthetic vowel to the left as in 'istrit' for street. In clusters that do not violate sonority learners inserted the epenthetic vowel between the two consonants as in 'silyed' for slide. But this rule was not shown in here as learners master both types of clusters. If learners transfer Arabic rule with clusters they would have inserted glottal stop before clusters. Thus I can say that learners show development stages in acquiring English clusters. What is shown in (15) above is correct production of clusters where learners did not apply epenthesis.

Although the data did not show significant results related to the CCC in initial, s/plosive –liquid is produced correctly by learners. They did not break this sequence of clusters. Again one can postulate that learners are re-setting parameters. They are acquiring clusters that are not present in their first language. The striking point is that they master this kind of cluster only in terms of production and not in perception. One can put the mechanism at play in this case for further discussion. This means production is governed by L2 whereas perception is governed by L1 at early stages. Further one can attribute these results to Broselow and Park (1995) as they adopted what they called the split parameter hypothesis which assumed that: there are two different representations. One is governing perception and the other is governing production and they are controlled by L1 and L2. I can suggest that more data is needed to test this hypothesis. Errors in perception of clusters showed that learners have difficulty which was not shown in the production of clusters. My data from perception was not equal with production.

The production of CC cluster in coda is mastered by our learners. In the sequence of the following learners show high mastery: lb/ld/lp/kt/lz/. One can find the use of the first language as this sequence does exist in MSA and LA. Although we cannot be sure

yet whether learners use their first language rules or apply another rule linked to each class of sequence. Table 5.8 below shows that mid-input learners produced more codas than other groups of learners. Yet all learners produce clusters without epenthesis. They produced the correct clusters. Thus errors were not significant in coda position.

Table 5.8 Target coda production

	Liquid/stop	Liquid/fricative	Stop/stop
Low-input	(25/120) 20%	(17/120) 14%	(12/120) 10%
Mid-input	(44/150) 29%	(29/150) 19%	(22/150) 14%
High-input	(21/75) 28%	(14/ 75) 18%	(10/75) 13%

Still there exists some correlation between perception and production of CC in coda. However, we cannot find accurate relationship between them without further research that concentrates on certain sequences of clusters in coda position. Still result of CC production of Arabic showed that learners do not use epenthesis to break clusters as -bn, -br, -bl, -ts, -tn, -tl, -ft,-fs, -fn, -sm, -sr, -sl, -nb, -nd, -nm. They violate sonority hierarchy but they also use transfer of MSA and LA. This is because MSA and LA allow CC in coda and the above combinations do exist in Arabic as in */Labn/* for milk and */nafs/* for self. I can assume that there are two processes, one related to transfer of L1 and the other is developmental which resetting of the parameter at the L2 value. The following examples are chosen as correct production of all learners despite of their level of exposure.

I expect learners to have problems with the sequence of CCC cluster in coda position but learners produce this cluster without breaking the sequence as in /kst/. This leads us to conclude that learners of different levels show developmental kind of acquiring as the sequence of the above clusters do not exist in their first language so their transfer is less obvious. Therefore they acquire this sequence of clusters. They seem to master this sequence in both perception and production. My concern is the developmental stages in the case of low, mid and high input. What is shown above is dealt with the clusters which are mastered by all learners.

The overall production of onset and coda by all learners is shown in the figures 5.14 and 5.15 below. These figures indicate that overall results of learners show

development in production of onset and coda. High input learners produced an amount of clusters which is higher than low and mid input learners. In figure 5.14 below low input learners showed 50%, mid input learners scores 55%, where high input learners scored above 60%.

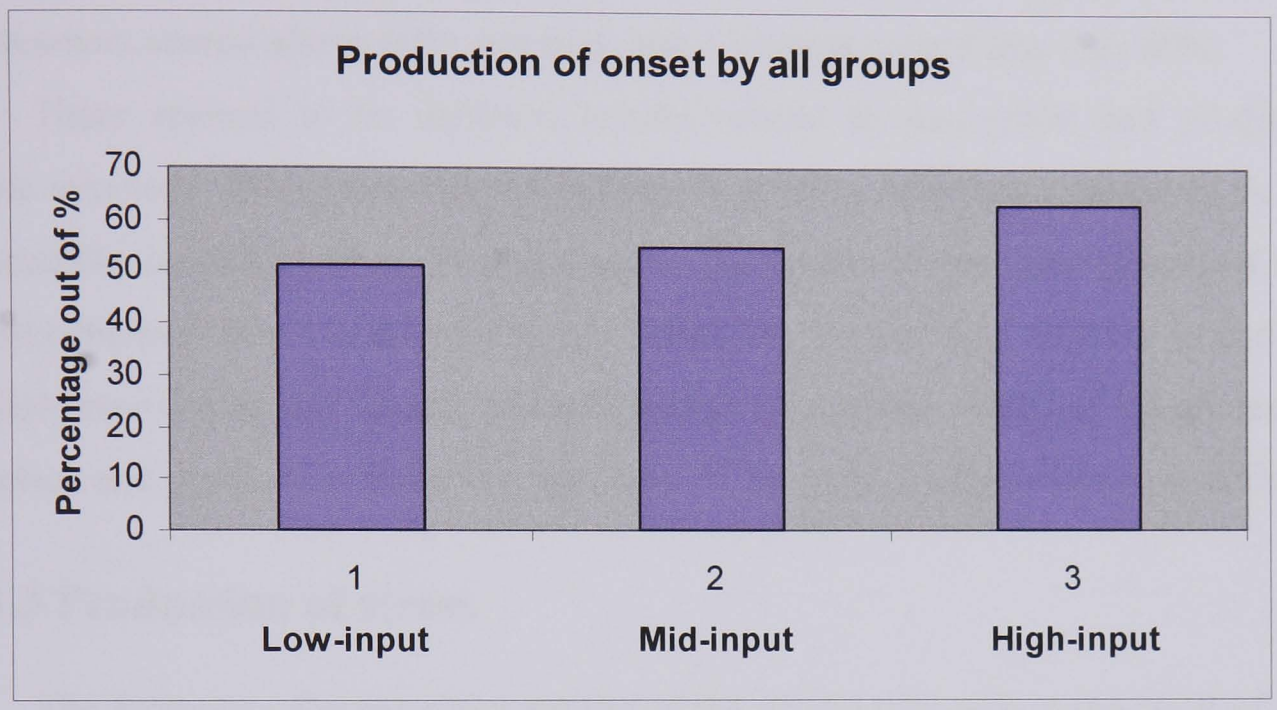

Figure 5.14

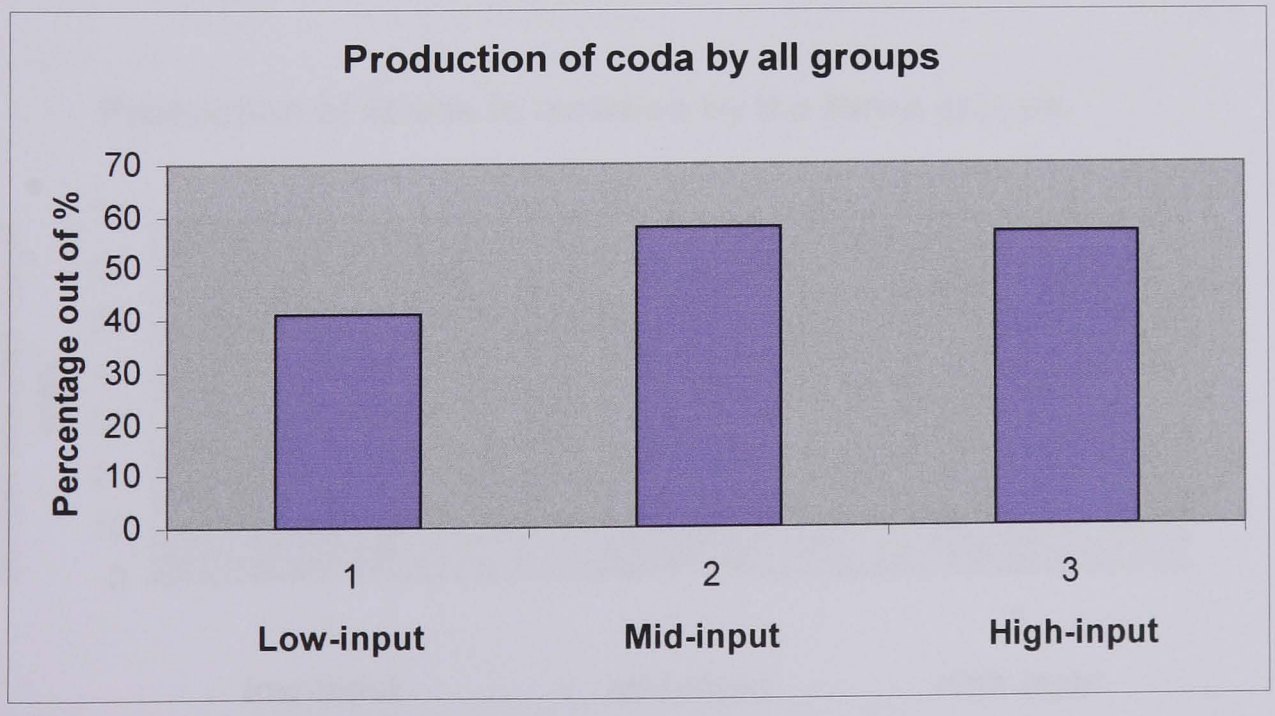

Figure 5.15

Although figure 5.15 show developmental stages, high input learners scored slightly higher than mid input learners. Thus I can prove that in the production of coda learners acquire the target language form as they did not break clusters in coda by epenthesis. The figures 5.14 and 5.15 above show general trends in the case of low, mid and high input learners only. In figure 5.15, low input learners scored above 40%, mid input learners scored above 60%, but high input learners scored less than 60%.

There seemed to be different results related to perception and production of syllable structure. The production of syllable is marked with less epenthesis as learners produced the correct clusters. That is clear in the results of the three groups of learners. However the perception results of syllable structure showed less mastery in early stages and high mastery at late stages. Overall results of syllable structure by all learners in perception and production show improvement in the case of Libyan learners of English.

5.7.3.3 Production of stress

The following figures show results of the production task at the level of stress in isolation and stress in sentence. They include results of low, mid and high input learners. The figures below show that learners do not master stress even at late stages when the input is very high. However there are development stages in acquiring as high input learners' scores show.

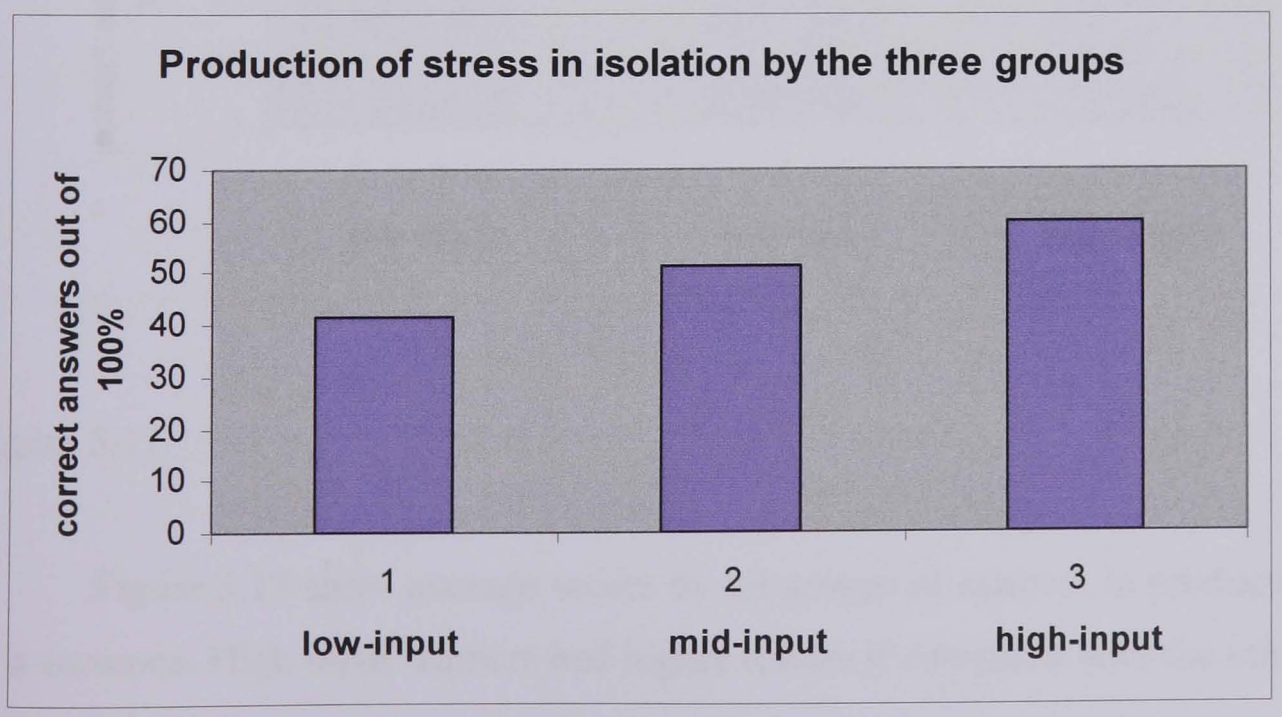

Figure 5.16

Figure 5.16 show the average results of the three groups of learners in the production of stress in isolation. High input learners had high results if compared with the other groups.

In results of production of stress in isolation by low-input learners, the highest score was 65%. The lowest score was 32%. Learners showed low mastery over stress in isolation. Most low-input learners had scores above 53%. (See Appendix B36)

In the case of mid-input learners, the highest score was 88%. The lowest score was 11%. Although mid-input learners had high scores, one learner seemed to have the lowest scores if compared with results of low-input learners. (See Appendix B37)

In the case of high-input learners, the highest score was 80%. The lowest score was 20%. This indicates that mid-input learners had higher scores if compared with high learners. This shows actual involvement of learners in perception and production of English accent. (See Appendix B Figure 38)

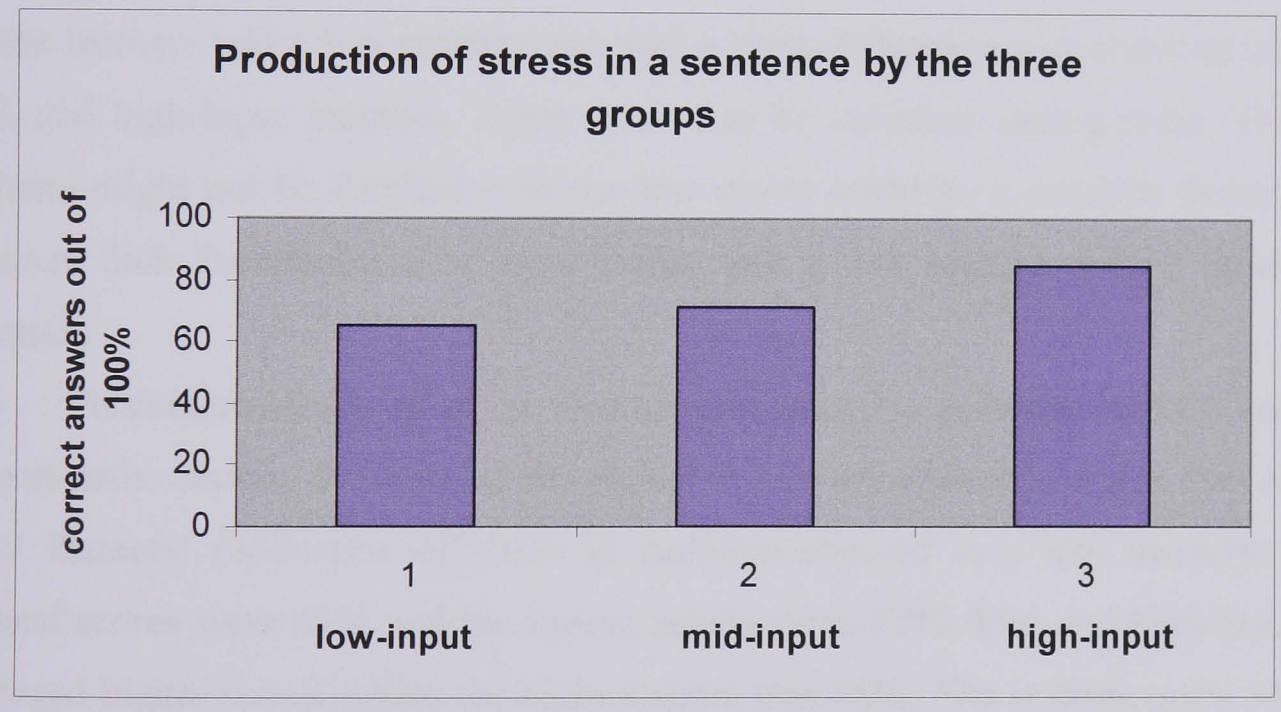

Figure 5.17

Figure 5.17 show average scores by all groups of learners in production of stress in a sentence. High input learners had higher results if compared with the other groups of learners.

Overall results show the production of stress on words in sentence by low-input learners. The highest score was 86%. The lowest score was 20%. Most low-input learners had scores above 58%. Thus learners showed high mastery over stress in a sentence if compared with stress in isolation. (See Appendix B Figure 39).

In the case of mid-input learners, the highest score was 89%. The lowest score was 18%. Mid-input learners seemed to have high scores in stress in isolation and stress on words in sentence. This is not clear in the case of low-input learners. See (Appendix B Figure 40)

In the case of high-input learners, the highest score was 99%. The lowest score was 67%. Results showed that high-input learners had the highest scores with stress on words in sentence if compared with low-input and mid-input learners. (See appendix B Figure 41)

When the stress data obtained are compared across subjects, a very different picture emerges depending on the test types: for stress in isolation, all the learners had a higher mastery rate and no difference was observed among them. But for sentence stress all the learners had a low mastery rate and a clear difference was observed among low, mid, and high-input learners. There seemed to be variation among them. The fact that learners might not be familiar with the test words could be a possible factor; I did not measure their familiarity with these words, and would suggest this be done in future research.

Production results of stress showed that learner's prosodic features continued to be non-native among different levels. However learners showed changes over time. Low-input learners' production of stress in isolation showed very low mastery where the highest scores were 65% and the lowest scores were 32%. Mid and high-input learners achieved higher scores where the highest score was 88%. The striking point was that the production of stress in a sentence was more accurate than that of stress in isolation. Learners of the three levels repeatedly scored high marks. Their most significant score was 89.28%.

As for the perception of stress in isolation, in the production task low-input learners had low scores in comparison with mid and high-input learners. The lowest

scores were 10%. On the other hand, mid and high-input learners had similar results. The highest score was 88%. (See Appendix B 36, 37&38)

Results showed that similar score of 89% was obtained by learners of different levels which was the highest among them. This can be attributed to learners' ability to master stress at the word level. They show significant control over sentence stress production when compared with sentence perception. Their production seemed to be more accurate than their perception. Production of stress in a sentence might be affected by developmental processes and not transfer from the first language.

In comparison with results of perception, for syllable structure, learners showed an average of 86% scores. However, very different learning graphs were observed for stress in isolation and sentence stress. Syllable structure showed high results when compared with word and sentence stress. At the level of sentence stress, all learners exhibited very little movement. Their average score was 43%.

Low-input learners' performance could be interpreted as overall upward results in syllable structure. For stress in isolation and sentence stress, however, learners showed no improvement. Their scores were below 48%. This result was obvious with mid and high-input learners.

The average scores of perception in the case of low-input learners were 43% in stress in isolation and 33% in sentence stress. In the case of mid-input learners, the average scores were 45% in stress in isolation and 31% in sentence stress. Whereas in the case of high-input learners, the average scores were 48% in stress in isolation and 33% in sentence stress.

Learners show development in most tasks. The only tasks that did not show development were the perception of CC fricative stop in coda as low input learners had higher scores than mid input learners, CCC stops in coda where mid input learners had higher scores than high input learners, and the perception of stress in a sentence as low input learners had higher results than mid input learners. I can assume that in these cases the input has less effect. Future study that looks more closely at the input learners actually get is needed to address these unexpected cases.

In general, most tests show developmental stages in average scores. The figures below show the average scores of syllable perception as well as stress perception and stress production.

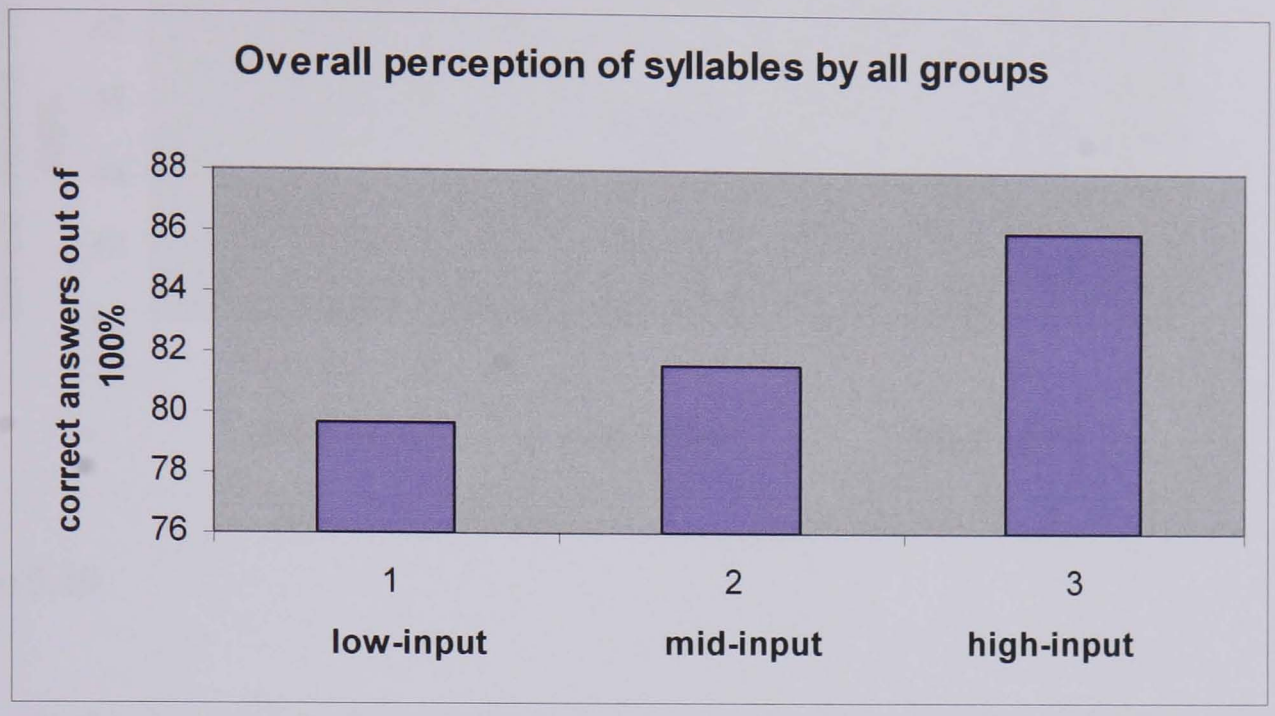

Figure 5.18

It is clear that high input learners show the highest scores in the perception of syllable as shown in figure 5.18 above. This shows developmental processes and indicates that transfer is less significant. The production of syllable in comparison with perception is marked with producing clusters without epenthesis. Although all learners achieved high scores, there is a development in producing these clusters as high input learners show complete mastery over clusters in onset and coda.

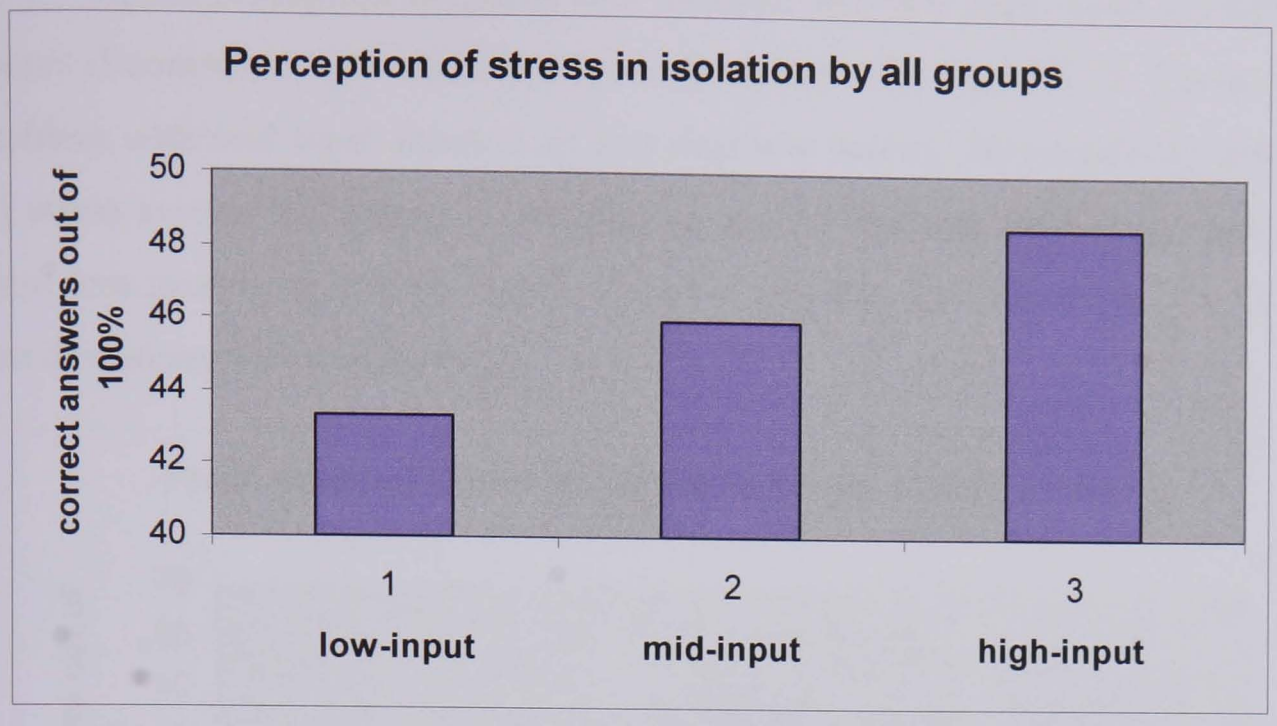

Figure 5.19

In the perception of stress in isolation, and as shown in figure 5.19 above, learners show upgrade results. Low input learners show an average of the lowest scores whereas high input learners show the highest scores. This also indicates that learners develop towards the correct perception of stress in isolation. One can notice that the highest scores were shown in the case of high input learners.

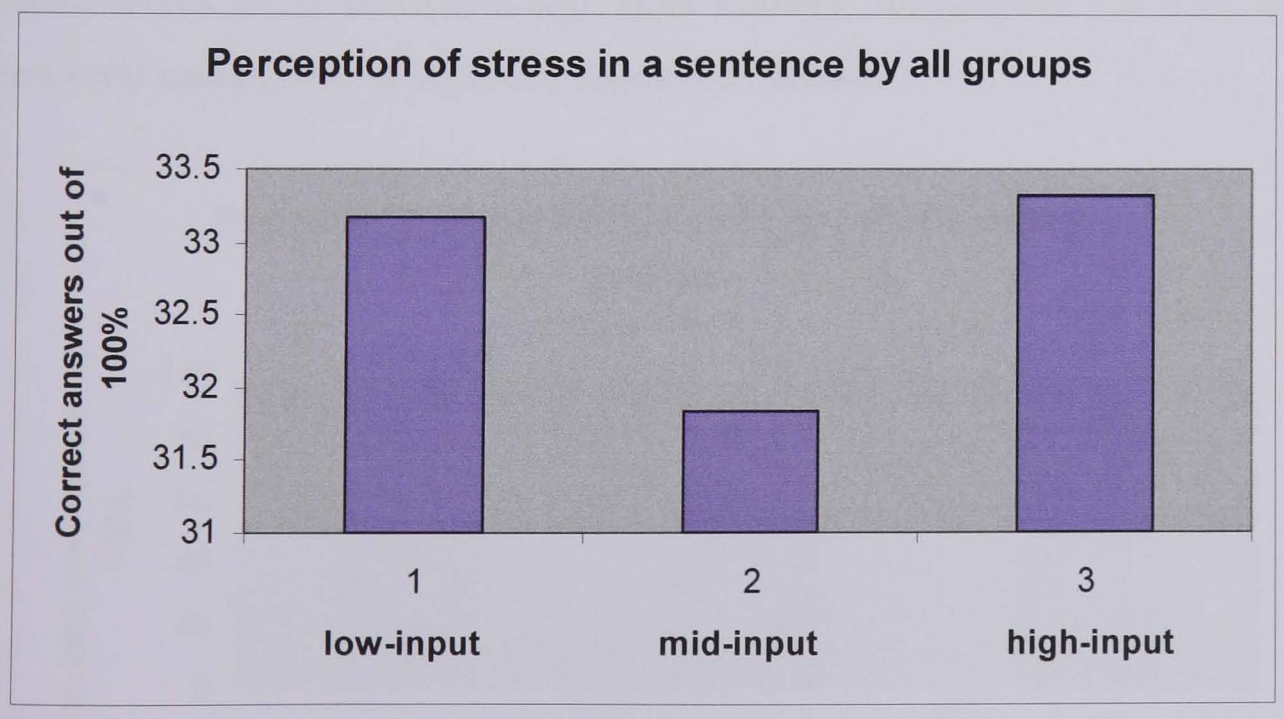

Figure 5.20

In the perception of stress in a sentence low and high input learners show high scores if compared with mid input learners as stated in Figure 5.20. There seemed to be problem with mid input learners as they had low scores. This might be attributed to the L1 stress system still being in operation or it could be attributed to the fact that learners show less mastery at certain stages. However one can note that high input learners show that developmental stages occur.

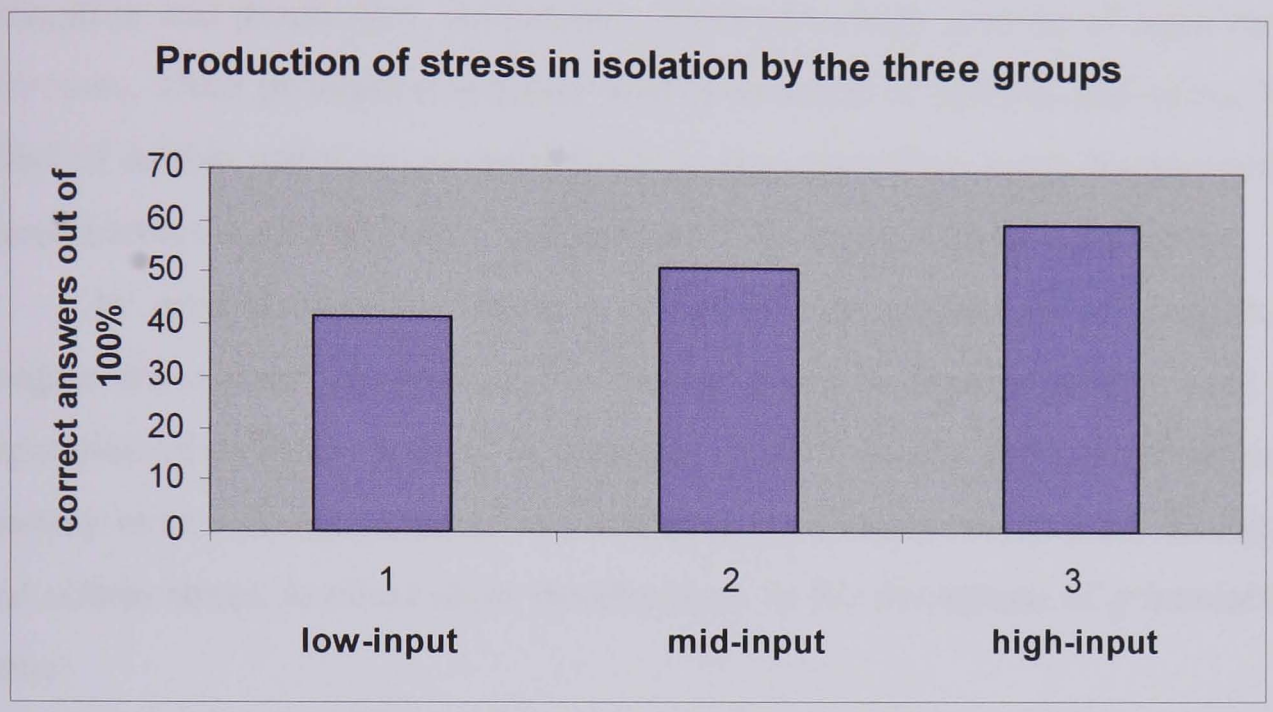

Figure 5.21

In the production of stress in isolation learners show development stages. The highest scores are in the case of high input learners. Furthermore low input learners show the lowest scores. This is shown in figure 5.21 above.

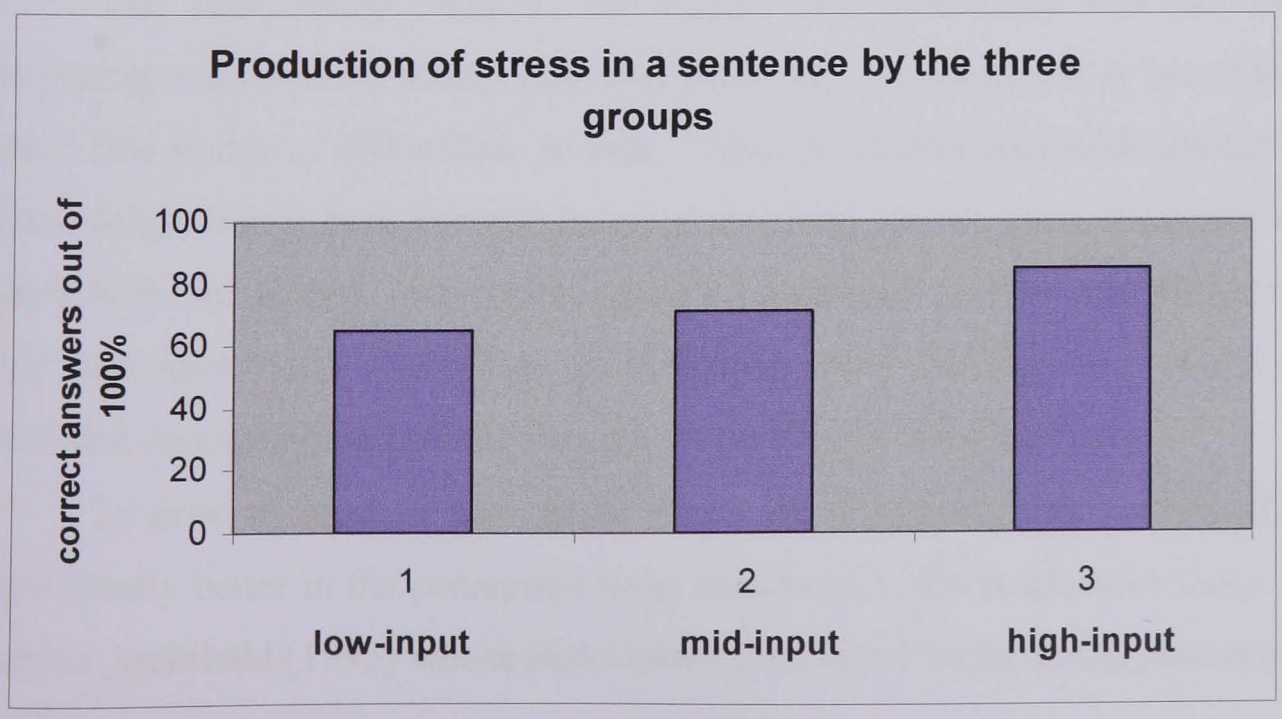

Figure 5.22

In the production of stress in a sentence, learners show developmental stages as results of high input learners indicate. High input learners show significant scores if compared with low and mid input learners. This is obvious in figure 5.22.

I conclude that learners show improvement according to their level. Low, mid and high input learners show developmental stages in acquiring syllable and stress. This is in both perception and production. As learners exposed to high amount of input their error rate decreases. Their perception is better than production of syllable and stress. However the effect of Arabic varieties was remarkable in the case of low input learners only, thus their transfer errors were very high. Further they show less developmental errors.

In general, sonority plays a major role in production of clusters as learners produce the correct clusters of TL. However developmental stages were clear in the perception of syllable clusters of English. Overall results show that learners have high mastery over syllable structure if compared with stress assignment. Results also show that within stress, learners show development in the perception of grammatical forms of stress.

Perception and production on the other hand are related but there are some cases where production results show low error rate if compared with perception errors in a similar task.

5.8 Perception vs. production

The relationship between perception and production can be drawn out in comparing results of my study. However this kind of comparison is not possible with all tasks. This is due to differences in data. I tried to present data with similar clusters and stress assignment in both perception and production. But this was not possible at times to match both. In clusters' perception I created sequences and presented them to subjects. This technique was not possible in production. Still one can find related issue which show that perception and production are related but in some aspects only.

In general, most of the results of my study indicate that participants performed significantly better in the perception tasks compared to the production tasks. This finding mirrors Archibald (1993) whose participants performed better in the perception tasks than

production tasks. Learners performed better in the sentence tasks when compared with word tasks. I can suggest that overall perception of learners is better than their production. The study however concentrates at specific part and though results are inconclusive.

However differences exist in the way individual learners perceptually process the L2 input and the differences seem to result in improvement or non-improvement in production. see Akita (2001).

The relationship between production and perception has been discussed by many researchers. They referred to the issue with different views. Sheldon & Strange (1982) found that Japanese learners' production of the English /r/ and /l/ contrast was more native like than in their perception. This leads to the idea that production is better than perception at some points. My results show this correlation between the perception and production where learners have high scores in production and low scores in perception. That was in production of stress on words in sentence related to perception of stress on words in sentence.

Bever (1981) argued that speech perception and production develop independently in second language acquisition. This result has been shown by my study. He further claimed that once production and perception are brought into alignment, and there is no ongoing learning activity when the role of psychogrammar ceases, perception and production progressively become independent and the critical period for speech learning ends. This independent state might be clear in my results as they show lack of correlation in some cases. Flege (1999) has argued that one would not expect to observe correlations between measures of post-critical period L2 learners' production and perception of L2 vowels and consonants. However the results of my studies show a possible relationship between perception and production of L2 syllable and stress. Thus the acquisition of the former should have an effect on the acquisition of the latter. Learners acquire syllable structure first after which stress can be mastered.

Dresher & Larkins (1980) suggest that perception and production ability, in first language acquisition and second language acquisition, is related, and as stated above my results have shown this finding. For second language acquisition, Major (1981) hypothesised that learners with good perceptual ability of L2 have a mental

representation identical to that of native speakers and they will gradually proceed to produce forms closer to the TL, whereas learners with poor perception need to first improve their perception and then their production. In my results it seemed that beginner learners scored similar results to intermediate and advanced learners. So the effect of the input was very significant in developing learners' performance. Flege (1981) has found out that the perception of L2 sounds may be more accurate than learners' production. However, my results indicate that perception of grammatical and non-grammatical forms was misleading. Furthermore, in some cases, results showed that the production of L2 learners was more accurate than their perception with stress on words in sentence.

Although most studies found that perceptual ability and productive ability were related in that better perception leads to better production. Oyama (1973) found that the more accurately the native Italian speakers were able to produce English sounds, the larger the number of words they were able to repeat in noise. Our results showed that some features are mastered in production much better than in perception and thus our results are not in line with previous findings. Meador et al (1997) found that the more accurately the participants pronounced English sentences, the larger the number of words they were able to repeat. They found that perceptual ability and productive ability were related, in the sense that better pronunciation leads to better comprehension. In the case of my learners perception and production are related in most tasks but there are cases were production is better than perception as stated above.

Results of my study are not in line with Flege et al (1997) who showed that relatively experienced non-native subjects both produced and perceived English vowels more accurately than inexperienced subjects. This could be attributed to the nature of components tested. My testing instruments included syllable and stress only.

Archibald (1998) argued that insights into L2 speech will be gained if we adopt the notion of abstract hierarchical representations at a variety of linguistic levels. These levels are, of course, related. Interesting connections between the tiers continue to be discovered. Thus I tried to find connection between syllable and stress in terms of perception and production. One can still associate perception with production but argue that results of different features lead to a correlation that might be positive or negative.

If I compare results of perception with production I can conclude that: in stress in isolation low-input learners showed high error rate whereas mid and high-input learners had similar results. Thus high-input learners showed low error rate. One can further suggest that high and mid-input learners had fossilization ceiling in production. This evidence was not clear in results of the perception task. Further, results showed that perception and production are controlled by the L1 in the case of low input learners. Then at late stages, in the case of mid and high-input learners L2 controlled perception and production where the role of L1 would be less significant. Major (1987), Broselow and Park (1995).

Although perception and production are not separate as stated in the literature but they seemed to be linked to L1 and L2. My suggestion is that in the case of L1 processes, learners' perception and production develop in relation to their L1 varieties. But in the case of L2, perception and production are effected by L1.This effect induces as learners exposed to high input of L2 accentuation system.

Perception of syllables seems to improve through the three levels of low-input, mid input, and high input learners. The production of syllables seemed to be improved at all levels as well but with different rates. This result indicates that perception and production of syllable are related and there are development stages in learning.

Results of my study suggest that more successful subjects have reset parameters from L1 to L2 values. It is also obvious as stated by Pater (1997) that parameter settings are the properties of individual lexical items, and this leads to different results obtained by each learner. Therefore learners seemed to acquire syllable structure of English and the stress in word and sentence. It is not clear yet which parameters are reset. But since learners acquire English syllable as native like this indicates that there is a parameter settings procedures.

We can note that in two of the three instances of a word being produced with antepenultimate stress, the speakers seemed to have difficulty producing the word, one of them with low exposure, making many false starts before managing to get the whole word out.

Immediately apparent in the results is the complete lack of stress placement based on the first language parameter settings, as well as the fact that the placement of stress

does not follow the same pattern as in the native speaker results. Assuming that the ratings are accurate, it is clear that these learners know, at some level of cognisance, that the stress pattern of English is different from the stress pattern of L1, but they do not possess the same knowledge of English stress as native speakers.

The present results are strengthened by the fact that they are in line with other findings from L1. In L1 acquisition learners follow developmental stages in acquiring their first language. L2 learners show development as they exposed to an amount of input in TL settings. This development differs in regard to perception and production. This leads to the assumption that the processes of L1 and L2 acquisition are relevant to each other. But the most surprising finding here is that there is evidence for settings of some parameters that are different from both the first and second languages. Furthermore the subjects of this study are in fact not alone in missetting metrical parameters when acquiring English.

Beyond the specificities of the parameter-setting framework, and of metrical phonology, results suggest that a view of second language acquisition in which learners start by making use of the L1 grammar, and then gradually alter to become more and more like the L2 one, is adequate. It seems that the input can cause an aspect of a learner's interlanguage to become more target-like than it was upon exposure to native speaker accented input.

In summary Libyan learners of English were studied as they continued to develop their L2 in a target language settings. Their phonological acquisition and the effect of such input on learners over time were examined. It was found that it is possible for L2 learners who have mainly been exposed to non native speaker accented input during their initial foreign language experience to improve their L2 phonology when they are in a target language setting exposed to native speaker accented input. It is also suggested that the acquisition of CC and CCC clusters in onset and coda leads to the L2 acquisition of syllable structure, revealing the vowel deletion processes rather than epenthesis. There was less improvement in stress of words and sentence. Finally one can argue that perception and production are related and that they are not two separate processes which are acquired independently, but still in the process of learning they are affected differently by TL.

Learners can reach a higher level of proficiency with exposure to native speaker accented input. Low-input learners had not yet improved their level as their scores were slightly lower. Both mid and high-input learners showed improvement in comparison. But high-input learners seemed to plateau at a certain stage, where no more improvement was shown.

In the perception of syllables, learners showed high mastery over English syllable structure, for both onset and coda. Further high input learners perceive differences between epenthesised and non-epenthesised forms. This shows that their perception of syllable has become native-like.

In the perception of stress learners had some difficulty in mastering stress in general. However, they had less difficulty in perception of stress in isolation when compared with perception of stress in a sentence. Final stress causes most of learners' problems.

In general, the production of syllable was marked with less epenthesis. Though low-exposure learners showed epenthesis with very low rate, mid and high-input learners showed no epenthesis in their production. This leads to the conclusion that they develop English syllable as they exposed to high amount of input. Moreover their production of syllable is native like. The L1 has a minor effect with its varieties. Furthermore the phonological competence of learners is shaped by the amount of input.

Learners have shown improvement despite their level. This leads to the conclusion that the amount of input in TL setting shape the competence of learners to be native like. Low input learners show high mastery in the acquisition of syllable in both perception and production. This goes in line with results of mid and high input learners as they show developmental stages as well. The second finding is that results of stress are consistent with learners' group. All results show low mastery in general but they indicate development in learning the stress assignment of English. They also indicate that there is a development in the acquisition of stress when results are compared with learners' level. However there is a variation in the acquisition of stress in isolation and stress in sentence.

Results of my study indicate that learners' phonology undergoes changes as they are exposed to an amount of input in target language settings. However the changes vary from one aspect to another. Syllable structure and stress show different level of mastery.

This means that error rate is higher in stress if compared with syllable structure by all groups of learners.

It is clear from results of this study that high input learners' scores are due to exposure as their results were better compared with other groups, that is, those who had spent less time exposed to English. A study considering a longer period is needed to find out the level of ultimate mastery by learners in regard to clusters and stress. Although age of the learners is a possible factor, it was not relevant for reasons given above (all learners had initially been exposed to English around the same time, and all had come to the UK after puberty. Thus the factor that differentiates learners is the amount of exposure to L2 in the target language country.

Chapter Six

Summary and Conclusion

Results of my study indicate that learners have shown developmental stages in their phonological competence towards TL parameters. In syllable structure, learners with high exposure show great mastery over syllable structure in both the onset and coda. However learners started with L1 parameters, as was obvious in the case of learners with low exposure. Then they showed a remarkable success in the case of learners with mid exposure. After that they showed high mastery over parameters of the TL. Therefore L1 parameters were less effective as learners were exposed to high amounts of input.

Results in stress yield different findings. It seems that our learners might not have a sufficient input in target language settings, and thus they lack mastery of the English stress system both at the level of word stress and stress in a sentence. This factor is very important in terms of target language input, since non-native input has been the norm in L1 settings. The previous knowledge of learners is composed of MSA and LA. This kind of input shaped the perception and the production of learners.

Learners were exposed to non-native accentuation system in an L1 setting for the period of learning L2 language. This input shapes their competence into having an interlanguage form. All subjects of my study are from Libya. Therefore their exposure to native English accent is very low or rare. They are exposed as other learners from Arabic backgrounds are to this kind of input. This may lead us to emphasise the role of the native speaker in teaching foreign languages in general and the English language in particular.

However, it is not clear when our learners transfer L1 parameter to their L2. Learners show a low rate of mastery that indicates they are still under the effect of L1

settings or they are mis-setting parameters which are different from the L2. We further assume that teachers are under the effect of the general aim which is language planning; this leads us to conclude that it is not the input alone but that there are other major factors that are in operation within language acquisition theory.

It also seems that perception and production of English by Arabic learners has been affected by the input of the target language. This effect is not clearly obvious. However there is a correlation between perception and production, in terms of mastery of the target language. Further, perception processes are more advanced than production. This means that the mechanism of both processes has been affected differently by the input of the target language. This finding shows that each process has to be analysed in isolation and not in relation to each other. The results of each study should be compared.

Another problem related to the vowel system of Arabic and English which may show a useful result in favour of perception and production of Arabic learners of English is that Arabic short vowels are not always represented orthographically as in English; they are part of learners' perception and cognitive representation. However, they are present orally, whereas in English all vowels are also written. This fact could be linked to what is mentioned above and more research is needed to clarify whether learners do not notice spelling clues for long vs. short vowels in English.

Further results of the study showed that at the level of syllable structure, low-input learners seem to perceive the two forms as the same even if they differ. They also perceive them as different even if they are the same. This leads us to conclude that the mechanisms of change are at work in acquisition but negative effects are in operation. We further show that this state is a turning point where the learner seems to reset parameters to the L2 and mis-set them at times.

In relation to input, results of perception and production show that input is an important factor for L2 phonology. Furthermore, this factor is responsible for final attainment in L2 phonology as well as for fossilization. That is obvious in the case of high input learners who showed high mastery on perception and production as native like. Other learners with a high amount of input had similar results with mid input learners. This indicates that learners fossilize at a certain period of time, despite the amount of

input. The mechanism in operation is that at certain level of acquisition learners had an acquisition process whereas at other levels they had a learning process.

My results show that while Libyan learners of English have no remarkable success in the acquisition of stress in isolation and sentence patterns, conversely they show a remarkable success within syllable structure. Furthermore, it is shown that learners have a higher mastery of perception over production. It is also confirmed that perception of syllable structure is higher if compared with perception of metrical stress. Previous studies indicate that age of learners had the most effect on final attainment. Results of my study show that the amount of input affects the phonological competence of learners in spite of their age.

Archibald (1993) found no correlation between knowing the word and getting the stress right. Perhaps there would be a correlation between frequently hearing a word and getting the stress right. This lack of correlation, though, fits nicely with the assumption that what the non-native speakers are doing is computing metrical structure, not storing stress as part of the lexical entry. My learners haven't reset parameters at the L2 values completely since they still use their L1 parameter settings.

Results revealed that adults performed significantly better on the perception task than on the production task in terms of number of errors made.

Thus the study of the effects of input on second language acquisition is still largely unknown. What we lack is an explicit theory of triggers that address the question of what kind of input will affect which parameters. The interlanguages of all subjects in this study were natural languages; they didn't violate the principles of UG in this domain. Each subject began his or her language-learning process with the same parameter-settings as the other members of the language group. My learners show similar results as they reset parameters, in the case of high input learners being native like; whereas others mis-setting parameters as they use an interlanguage system. Furthermore, it seems most likely that the learners are resetting their parameters (at least for words if not for entire systems), and this results in IL systems. Their systems are different both from the L1 system and the L2 system.

Therefore I can conclude that the rate of change is very slow. Learners have started off by mis-setting parameters but L1 parameter settings are still in operation. The

effect of positive evidence with potentially positive effect is very low in the case of Libyan learners who had received foreign-accented input for many years. However, some aspects of their phonology underwent significant change.

As mentioned earlier, there were some attempts for improving learners' phonology in perceptual training and instructions. Bongaerts, Summeren, Planken & Schils (1997) mentioned that the task of L2 learners can be made less difficult by providing them with input enhancement in the shape of perceptual training aimed at focusing their attention on subtle phonetic contrasts between the L1 and the target language. This takes the shape of training learners in the production of L2 speech sounds in order to develop the finely tuned motor control requirements of accurate pronunciation. This fact is in accordance with Flege's (1987, 1995) work claiming that foreign accents are largely perceptually based, and to learn a new language one needs to shift from the L1-tuned phonetic categories to the continuous mode of perception for people learning their L1.

Furthermore, Moyer (1999) has found a significant correlation between outcome and type of phonological feedback received. Those who were given both suprasegmental and segmental feedback scored closer to native in a predictable consonant relationship. Twenty-four highly proficient adult English learners of German were studied. Subjects were all exposed to German after the age of ten and were highly motivated given their extensive use of German through teaching, studying and research. A background questionnaire identified and grouped variables according to the following topics : i biological variables (age of immersion, age of instruction); ii instructional variables (years of instruction, years of teaching, years of immersion, amount of phonological feedback, type of feedback (segmental, suprasegmental, or both), iii affective variables (type of motivation, self-evaluations of pronunciation, attitude towards pronunciation, self evaluation of cultural and linguistic assimilation while immersed in the TL environment).

In Moyer's studies, informants were asked to read: firstly, a list of words; secondly, a list of sentences; thirdly, a paragraph of text; and also participate in a free response section in which they could choose any one of five possible topics and speak freely for at least five to ten sentences. Four native speakers volunteered to listen to the

speech samples for each talk and determined whether the speaker was a native German. Each informant was rated by two judges. For each judgement, a confidence rating was requested (very confident, fairly confident, and not confident).

When applied to the binary judgment (native speaker vs. non-native speakers) this resulted in a 6 point scale of judgement (1 definitely not native, 2 probably not native. 3 maybe native, 6 definitely non-native). These individual 6 point ratings were then averaged for both judges listening to all four speech tasks and a mean rating across tasks was assigned to each speaker based on that overall average.

Their findings showed that, first, the higher the age of immersion and instruction, the higher the mean rating (lower accuracy). Second the higher the category for phonological feedback (indicating suprasegmental as well as segmental feedback) the lower the mean rating (greater accuracy). Thus those who cited stress, rhythm and intonation training or feedback scored significantly closer to the native range than those who did not. It is further concluded that there the type of feedback is more significant than the amount, for acquiring native like mastery level of pronunciation.

Pennington & Ellis (2000) examined the performance of advanced Cantonese speakers of English on recognition memory for English sentences in which prosody was the feature discriminating otherwise identical sentence pairs. Although speakers' memory for the English sentences based on prosodic information was generally poor, when learners were explicitly directed to pay attention to intonation, significant improvement in recognition was observed for sentences in which prosody cued a marked information focus (contrastive stress) versus an unmarked one (neutral sentence intonation). Thirty advanced Cantonese speakers of English completed two experiments conducted in a sequence: untutored (implicit) condition (experiment 1) followed by a tutored (explicit) condition (experiment 2). For each experiment, there was a study phase followed by a recognition task.

The recognition task in the two experiments were identical, and subjects were required to listen to 48 sentences and decide whether or not each sentence they now heard was exactly the same as one of the sentences they had heard in the previous study phrase.

In experiment 1, informants demonstrated a high level of lexical memory in their ability to recognise previously heard sentences and identify new ones, while they were

poor at identifying sentences having the same lexis as in previously heard sentences spoken with different intonation. Pennington & Ellis argued that learners did not attend to key phonological information in the speech signal of the L2 and they did not have the relevant knowledge of how intonation resolves ambiguity and relied solely on lexical information. The recognition phase of experiment 2 revealed that informants' memory for previously heard sentences spoken with new prosody could be improved to a small extent by explicit priming of contrast cues. They suggest that emphasis on raising L2 prosodic awareness of contrastive pairs may help the L2 learners analyse the target languages prosody as a representational system, with that of other skills if the programme involves perceptual training such as audio and video feedback.

Leather (1983) and Pennington (1989) pointed out that training and sufficient instructions in rhythm and stress patterns have generally been ignored, thus the need to re-evaluate such approaches and include suprasegmental training for foreign language learners is highly recommended. This is suggested by de Bot & Mailfert (1982) and Chun (1988).

Although the importance of oral skills in foreign language teaching has finally been acknowledged, and classes dedicated to listening/speaking skills have been scheduled, teachers are very much left on their own to teach such classes. They may be using time for general listening-comprehension without much focus on the phonological features of English.

Pennington (2000) has indicated that L2 learners benefit from explicit instruction and that emphasis on raising L2 prosodic awareness by encouraging learners to concentrate on the cues are helpful for learners to interpret spoken sentences. Furthermore, since perception training has been shown to facilitate production skill, it seems reasonable to suggest that explicit instruction in prosody is very much called for (Bradlow, Pisoni, Yamada & Tohkura 1996).

It was indicated by Suter (1976) that among a range of exposure and attitudinal variables, concern for pronunciation accuracy was one of the most significant factors for developing L2 phonology. Further research is needed to find the best way of teaching such skills, in addition to the nature of the phonological problems with the specific L1 encountered, and suggest what should be included in the teaching programme, how it

should be presented and how the methods should be empirically tested to develop the most effective pronunciation teaching programme for learners.

Previous research dealt with Libyan learners of English. Salem (1991), Milton (1984) and Bottaga (1991) have found that foreign language phonology is based on first language phonology. It is also shown that the development of SL phonology is almost the same as that of first language development. However, my results have shown that the development of perception and production of the L2 syllable and stress are different. For the syllable, developments are different in onset and coda. In stress, development stages vary at the level of word stress as well as stress in a sentence.

The development of perception and production is governed by the amount of input in TL settings. This amount of input shapes learners' phonological competence in perception and production. However it is a hard task to isolate perception from production since perception precedes production. But within the SLA framework it is possible to find out the process at which the L2 has a major effect on perception or production of learners. My results showed that at early stages, when learners had low exposure to L2, their perception only is governed by the L2. Lately, at final stages of learning, when learners had high exposure to the L2, both their perception and production are driven by the L2. This was more clearly expressed in the overall results of the tasks of low exposure learners as they had high results in perception and low results in production. High exposure learners had high results in their perception and production which indicates that the L2 governs both perception and production.

The broad aim of the study was to find out the developmental stages in the perception and production of Libyan learners of English in TL settings. Furthermore the effect of the amount of input on learners who were exposed to a non-native accent was traced to find out the changes in learners' phonological competence. Thus results of various groups of learners were tabulated to find out the developmental stages among learners of different levels.

The study revealed that if learners were taught English pronunciation by native speakers of English their speed at mastering the accentuation system will be quicker.

Thus the role of native speaker of target language is very important at the level of pronunciation teaching.

My study is useful for theoretical bases and application of results in teaching pronunciation. Theoretically, it is important to consider language varieties in dealing with learners, and to consider the role of the standard in shaping the phonological competence of the learner. For the application of the results, we can benefit from the role of the input in final attainment in L2 phonology. However, my data show many variables which cannot be controlled without careful manipulation. It was a hard task to find similar features that link perception and production within one testing instrument. In other words, one can control the testing methods of perception, but production data cannot be controlled if it is large, though I have analysed my production data and tried to find a link between perception and production at various parameters. Furthermore I have not applied error analysis to show what sort of errors was made by each learner; instead I was interested in the developmental stages of learning. Future research should try to link each parameter in perception to its counterpart in production to show the mechanism at work in the phonological competence of the learner. In general the following remarks were shown out:

i Learners have shown improvement according to their level. This is based in the amount of input learners were exposed to. Thus low, mid, and high input learners showed developmental stages in acquiring syllable structure and stress of English. This improvement was in both perception and production. Learners showed mastery over perception before production in mastering TL. They used their L1 syllable structure at early stages later, they acquired TL structure.

ii.They have shown developmental stages in the perception and production of clusters in onset and coda based on the amount of input. As they are exposed to sufficient input, learners perceived and produced clusters of English without epenthesis. Thus learners had no difficulty in producing and perceiving English clusters as they had high amount of input.

iii.Generally, learners acquired syllable structure of English first. Then they showed mastery over stress assignment. This could be attributed to the fact that syllable structure plays major role in acquiring stress of a language. Further they showed development in

the perception of grammatical forms of stress. Thus learners got the stress right in late stages. High input learners showed greater mastery over stress.

iv.Errors in syllable structure and stress assignment decreased with level of learners. This could be attributed to the fact that errors are not based on transfer of L1 at late stages; rather they are results of developmental stages.

v.Arabic varieties had a significant role in shaping the phonological competence of my subjects in the case of low input learners only. The fact is that low input learners come to the task with their Arabic structure. As they exposed to English input their phonological competence undergo changes towards TL structures. This is clear in the case of mid and high input learners.

vi.For clusters, sonority played a major role as learners followed the rules adopted by sonority scale. This is due to the fact that the ease of acquisition corresponds to the degree of sonority. But developmental stages played a remarkable role as well.

vii.Error rate decreased for Arabic-based errors at the same rate as developmental errors.

viii.learners showed fewer errors of transfer and development as they exposed to high amount of input.

In chapter two I tried to show that interlanguage phonology is related to various factors. Age is one significant factor in addition to the amount of input. However, the amount of input seemed to play a major role in shaping the phonological competence of learners. The L2 acquisition of syllable and stress was dealt with. Then the perception and production of learners were investigated. Perception in L1 played a major role in L2. After that perception in relation to production was dealt with. Furthermore, incorrect perception and production and intelligibility were covered. I also shed light on foreign language teaching and input. I tried to link the amount of input in previous language settings to the amount of input in target language settings.

In chapter three I suggested that learners' L1 was very important if a complete picture related to perception and production is to be obtained. Thus I found out that MSA and LA variety have an influence in shaping the phonological competence of our learners. This mixture has driven the process in an L2 environment. For Arabic the /q/ seemed to be a marker among various dialects. This sound plays a major role in the dialects of Arabic. The sequence of clusters in onset and coda showed the effect of both

MSA and LA. One can show the effect of differences of the stress of MSA and LA varieties. This has a major effect on perception and production as well.

In chapter four I tried to show studies of Arabic learners of English syllable structure and stress. Then I showed the technique followed in teaching English pronunciation in first language settings and particularly in Libya. As there were not many studies that dealt with the syllable structure of Arabic native speakers learning English in target language settings, I concentrated on the onset and coda as margins. Thus the sequences of clusters were dealt with.

In chapter five, I presented methods of collecting data and the results of the study. Most findings were related to the relationship between perception and production in L2 phonology.

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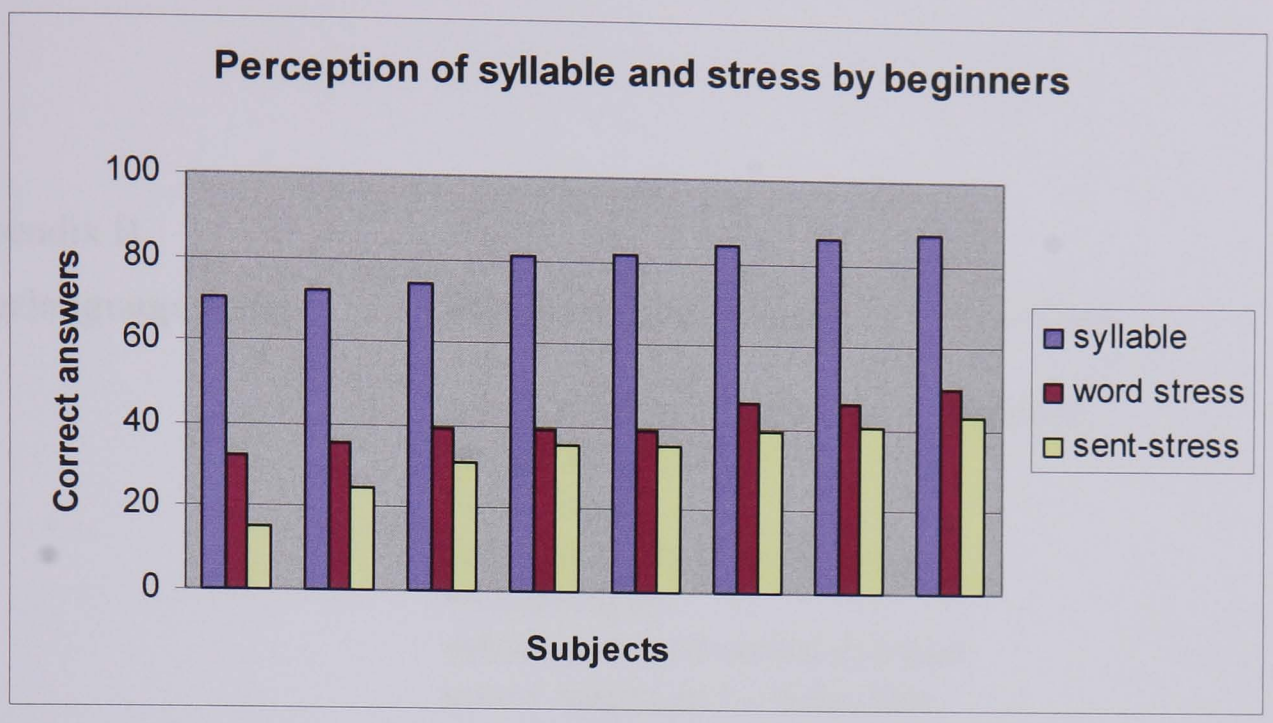
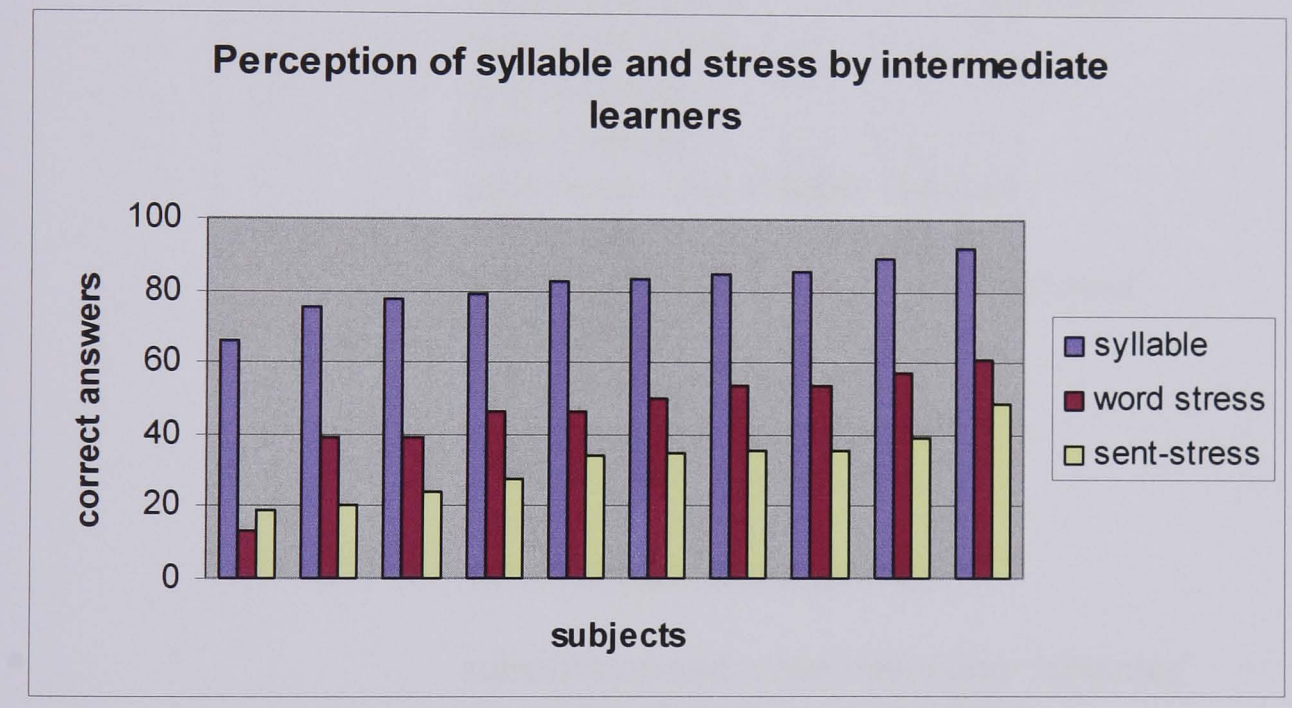
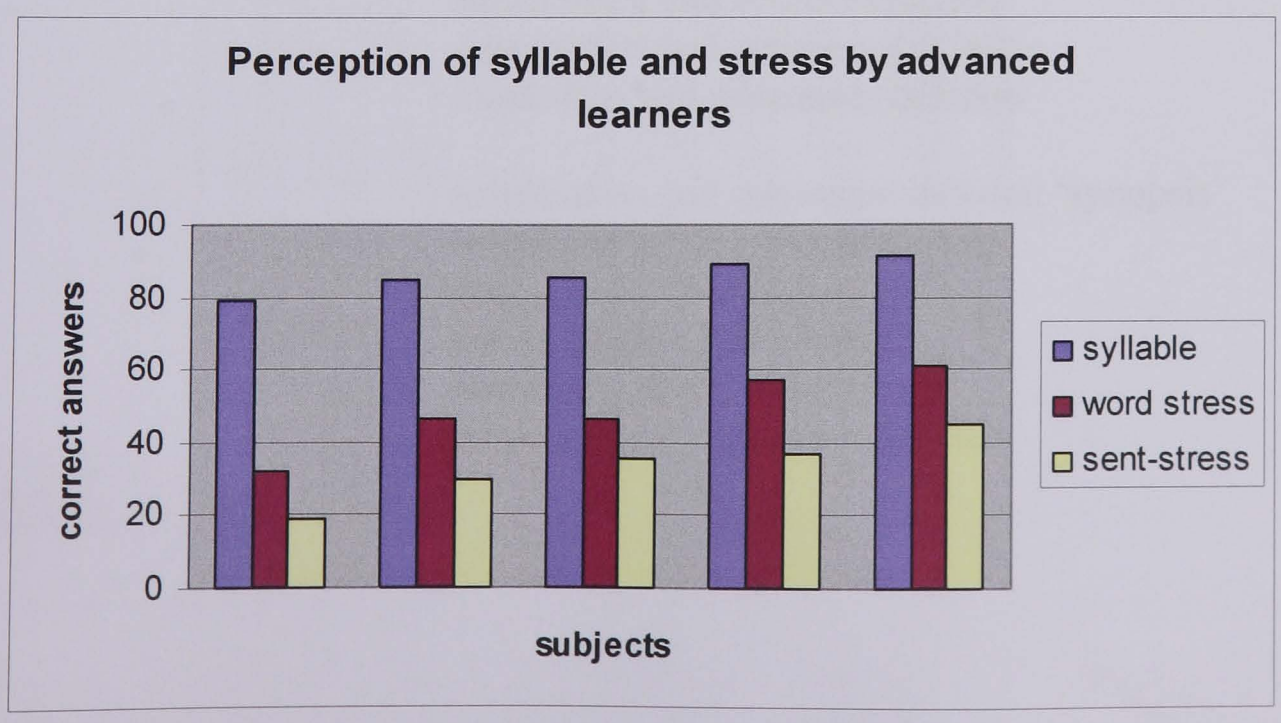
Appendices:

Appendix: A Figure 4.1, 4.2, 4.3.







Appendix B

Interlanguage form	**Processes and changes**	**TL Gloss**
	substitution and epenthesis	'spiccato'
	vowel reduction	
	vowel length	
	substitution and vowel length	
	vowel length	
	substitution and vowel deletion	
	vowel length and substitution	
	cluster reduction	'psychosis'
	vowel reduction	
	vowel length	
	vowel length	
	substitution and syllable deletion	
	vowel reduction	'trachoma'
	vowel length	
	substitution and vowel reduction	
	epenthesis and vowel reduction	
	substitution and vowel length	
	substitution and vowel deletion	
	vowel reduction and deletion	
	substitution and vowel reduction	'tectonics'
	vowel length and consonant deletion	
	consonant deletion and vowel reduction	
	substitution and vowel reduction	
	substitution and consonant deletion	
	/r/addition and consonant deletion	
	substitution and consonant deletion	'synopsis'
	vowel reduction and substitution	
	vowel length and reduction	
	vowel length and epenthesis	
	vowel length and substitution	
	reduction and consonant deletion	

vowel reduction	
substitution and reduction	
substitution and vowel length	‘incentive’
reduction	
substitution	
substitution	
addition and substitution	
vowel reduction	
substitution and vowel reduction	‘parapet’
vowel length	
substitution and vowel reduction	
vowel reduction	
deletion and vowel reduction	
vowel reduction	‘advocate’
vowel length	
reduction	
vowel deletion	
reduction and vowel deletion	
substitution and vowel length	‘calibre’
vowel length and substitution	
substitution and reduction	
reduction	
vowel deletion and reduction	

Appendix C

Battery (3)

CC /stops

1.a.	"Play"	I said the word play.
1.b.	"Play"	I said the word pilay.
1.c.	"pilay"	I said the word play.
1.d.	"pilay"	I said the word pilay.
2.a.	"play"	I said the word play.
2.b.	"play"	I said the word iplay.
2.c.	"iplay"	I said the word play.
2.d.	"iplay"	I said the word iplay.
3.a.	"blue"	I said the word blue.
3.b.	"blue"	I said the word iblue.
3.c.	"iblue"	I said the word iblue.
3.d.	"iblue"	I said the word blue.
4.a.	"bilue"	I said the word bilue.
4.b.	"blue"	I said the word blue.
4.c.	"bilue"	I said the word blue.
4.d.	"blue"	I said the word bilue.
5.a.	"clear"	I said the word clear.
5.b.	"clear"	I said the word iclear.
5.c.	"iclear"	I said the word clear.
5.d.	"iclear"	I said the word clear.
6.a.	"iclear"	I said the word iclear.
6.b.	"clear"	I said the word clear.
6.c.	"iclear"	I said the word iclear.
6.d.	"iclear"	I said the word clear.
7.a.	"glass"	I said the word glass.
7.b.	"glass"	I said the word iglass.
7.c.	"iglass"	I said the word iglass.
7.d.	"iglass"	I said the word glass.
8.a.	"gilass"	I said the word gilass.
8.b.	"glass"	I said the word glass.
8.c.	"gilass"	I said the word glass.
8.d.	"glass"	I said the word gilass.

9.a.	“pry”	I said the word piry.
9.b.	“pry”	I said the word pry.
9.c.	“piry”	I said the word piry.
9.d.	“piry”	I said the word pry.
10.a.	“ipry”	I said the word ipry.
10.b.	“pry”	I said the word pry.
10.c.	“ipry”	I said the word pry.
10.d.	“pry”	I said the word ipry.
11.a.	“brown”	I said the word brown.
11.b.	“ibrown”	I said the word ibrown.
11.c.	“ibrown”	I said the word brown.
11.d.	“brown”	I said the word ibrown.
12.a.	“birown”	I said the word brown.
12.b.	“birown”	I said the word birown.
12.c.	“brown”	I said the word brown.
12.d.	“brown”	I said the word birown.
13.a.	“crap”	I said the word crap.
13.b.	“icrap”	I said the word icrap.
13.b.	“crap”	I said the word icrap.
13.c.	“icrap”	I said the word crap.
14.a.	“crap”	I said the word cirap.
14.b.	“crap”	I said the word crap.
14.c.	“cirap”	I said the word cirap.
14.d.	“cirap”	I said the word crap.
15.a.	“green”	I said the word green.
15.b.	“igreen”	I said the word igreen.
15.c.	“green”	I said the word igreen.
15.d.	“igreen”	I said the word green.
16.a.	“try”	I said the word try.
16.b.	“itry”	I said the word itry.
16.c.	“itry”	I said the word try.
16.d.	“try”	I said the word itry.
17.a.	“tiry”	I said the word tiry.
17.b.	“try”	I said the word try.
17.c.	“tiry”	I said the word try.
17.d.	“try”	I said the word tiry.

18.a.	"dry"	I said the word dry.
18.b.	"idry"	I said the word idry.
18.c.	"idry"	I said the word dry.
18.d.	"dry"	I said the word idry.
19.a.	"ipure"	I said the word pure.
19.b.	"pure"	I said the word pure.
19.c.	"ipure"	I said the word ipure.
19.d.	"pure"	I said the word ipure.
20.a.	"beauty"	I said the word beauty.
20.b.	"ibeauty"	I said the word ibeauty.
20.c.	"beauty"	I said the word ibeauty.
20.d.	"ibeauty"	I said the word beauty.
21.a.	"cure"	I said the word icure.
21.b.	"cure"	I said the word cure.
21.c.	"icure"	I said the word cure.
21.d.	"icure"	I said the word icure.
22.a.	"tune"	I said the word tune.
22.b.	"itune"	I said the word itune.
22.c.	"itune"	I said the word tune.
22.d.	"tune"	I said the word itune.
23.a.	"due"	I said the word idue.
23.b.	"due"	I said the word due.
23.c.	"idue"	I said the word idue.
23.d.	"idue"	I said the word due.
24.a.	"quite"	I said the word quite.
24.b.	"quite"	I said the word iquite.
24.c.	"iquite"	I said the word iquite.
24.d.	"iquite"	I said the word quite.
25.a.	"gwyn"	I said the word gwyn.
25.b.	"gwyn"	I said the word igwyn.
25.c.	"igwyn"	I said the word igwyn.
25.d	"igwyn"	I said the word gwyn.
26.a.	"twice"	I said the word itwice.
26.b.	"itwice"	I said the word itwice.
26.c.	"itwice"	I said the word twice.
26.d.	"twice"	I said the word twice.

27.a.	"tiwice"	I said the word twice.
27.b.	"twice"	I said the word twice.
27.c.	"tiwice"	I said the word tiwice.
27.d.	"twice"	I said the word tiwice.
28.a.	"dwell"	I said the word idwell.
28.b.	"dwell"	I said the word dwell.
28.c.	"idwell"	I said the word idwell.
28.d.	"idwell"	I said the word dwell.

CC/fricative.

29.a.	"few"	I said the word few.
29.b.	"ifew"	I said the word ifew.
29.c.	"ifew"	I said the word few.
29.d.	"few"	I said the word ifew.
30.a.	"thew"	I said the word ithew.
30.b.	"ithew"	I said the word ithew.
30.c.	"thew"	I said the word thew.
30.d.	"ithew"	I said the word thew.
31.a.	"sue"	I said the word sue.
31.b.	"sue"	I said the word isue.
31.c.	"isue"	I said the word isue.
31.d.	"isue"	I said the word sue.
32.a.	"view"	I said the word iview.
32.b.	"view"	I said the word view.
32.c.	"iview"	I said the word iview.
32.d.	"iview"	I said the word view.
33.a.	"ihuman"	I said the word ihuman.
33.b.	"human"	I said the word human.
33.c.	"human"	I said the word ihuman.
33.d.	"ihuman".	I said the word human.
34.a.	"flood"	I said the word flood.
34.b.	"iflood"	I said the word iflood.
34.c.	"iflood"	I said the word flood.
34.d.	"flood"	I said the word iflood.
35.a.	"filood"	I said the word filood.
35.b.	"flood"	I said the word flood.
35.c.	"flood"	I said the word filood.
35.d.	"filood"	I said the word flood.

36.a.	“islim”	I said the word slim.
36.b.	“slim”	I said the word slim.
36.c.	“islim”	I said the word islim.
36.d.	“slim”	I said the word islim.
37.a.	“silim”	I said the word silim.
37.b.	“slim”	I said the word slim.
37.c.	“slim”	I said the word silim.
37.d.	“silim”	I said the word slim.
38.a.	“free”	I said the word free.
38.b.	“ifree”	I said the word ifree.
38.c.	“free”	I said the word ifree.
38.d.	“ifree”	I said the word free.
39.a.	“firee”	I said the word free.
39.b.	“firee”	I said the word firee.
39.c.	“free”	I said the word firee.
39.d.	“free”	I said the word free.
40.a.	“three”	I said the word ithree.
40.b.	“three”	I said the word three.
40.c.	“ithree”	I said the word ithree.
40.d.	“ithree”	I said the word three.
41.a.	“tihree”	I said the word three.
41.b.	“tihree”	I said the word tihree.
41.c.	“three”	I said the word tihree.
41.d.	“three”	I said the word three.
42.a.	“thwack”	I said the word ithwack.
42.b.	“ithwack”	I said the word ithwack.
42.c.	“ithwack”	I said the word thwack.
42.d.	“thwack”	I said the word thwack.
43.a.	“iswim”	I said the word iswim.
43.b.	“swim”	I said the word swim.
43.c.	“iswim”	I said the word swim.
43.d.	“swim”	I said the word iswim.
44.a.	“siwim”	I said the word swim.
44.b.	“swim”	I said the word swim.
44.c.	“siwim”	I said the word siwim.
44.d.	“swim”	I said the word siwim.
45.a.	“spend”	I said the word spend.
45.b.	“ispend”	I said the word ispend.

45.c.	"ispend"	I said the word spend.
45.d.	"spend"	I said the word ispend.
46.a.	"spend"	I said the word spend.
46.b.	"sipend"	I said the word sipend.
46.c.	"sipend"	I said the word spend.
46.d.	"spend"	I said the word sipend.
47.a.	"istand"	I said the word istand.
47.b.	"stand"	I said the word stand.
47.c.	"istand"	I said the word stand.
47.d.	"stand"	I said the word istand.
48.a.	"sitand"	I said the word stand.
48.b.	"sitand"	I said the word sitand.
48.c.	"stand"	I said the word sitand.
48.d.	"stand"	I said the word stand.
49.a.	"sky"	I said the word isky.
49.b.	"isky"	I said the word isky.
49.c.	"sky"	I said the word isky
49.d.	"sky"	I said the word sky.
50.a.	"siky"	I said the word siky.
50.b.	"sky"	I said the word siky.
50.c.	"sky"	I said the word sky.
50.d.	"siky"	I said the word sky.
51.a.	"ismall"	I said the word small.
51.b.	"ismall"	I said the word ismall.
51.c.	"small"	I said the word small.
51.d.	"small"	I said the word ismall.
52.a.	"small"	I said the word small.
52.b.	"simall"	I said the word simall.
52.c.	"simall"	I said the word small.
52.d.	"small"	I said the word simall.
53.a.	"snow"	I said the word isnow.
53.b.	"isnow"	I said the word isnow.
53.c.	"snow"	I said the word snow.
53.d.	"isnow"	I said the word snow.
54.a.	"snow"	I said the word snow.
54.b.	"sinow"	I said the word snow.

54.c.	"sinow"	I said the word sinow.
54.d.	"snow"	I said the word sinow.
55.a.	"isphere"	I said the word isphere.
55.b.	"sphere"	I said the word sphere.
55.c.	"isphere"	I said the word sphere.
55.d.	"sphere"	I said the word isphere.
56.a.	"siphere"	I said the word sphere.
56.b.	"siphere"	I said the word siphere.
56.c.	"sphere"	I said the word siphere.
56.d.	"sphere"	I said the word sphere.
57.a.	"spew"	I said the word spew.
57.b.	"ispew"	I said the word ispew.
57.c.	"ispew"	I said the word spew.
57.d.	"spew"	I said the word ispew.
58.a.	"sipew"	I said the word spew.
58.b.	"sipew"	I said the word sipew.
58.c.	"spew"	I said the word sipew.
58.d.	"spew"	I said the word spew.
59.a	"skew"	I said the word skew.
59.b	"skew"	I said the word iskew.
59.c.	"iskew"	I said the word skew.
59.d.	"iskew"	I said the word iskew.
60.a.	"sikew"	I said the word sikew.
60.b.	"skew"	I said the word skew.
60.c.	"skew"	I said the word sikew.
60.d.	"sikew"	I said the word skew.
61.a.	"istew"	I said the word istew.
61.b.	"stew"	I said the word stew.
61.c.	"istew"	I said the word stew.
61.d.	"stew"	I said the word istew.
62.a.	"stew"	I said the word stew.
62.b.	"sitew"	I said the word sitew.
62.c.	"stew"	I said the word sitew.
62.d.	"sitew"	I said the word stew.
63.a.	"ispring"	I said the word ispring.
63.b.	"spring"	I said the word spring.
63.c.	"ispring"	I said the word spring.

63.d.	"spring"	I said the word ispring.
64.a.	"sipring"	I said the word spring.
64.b.	"sipring"	I said the word sipring.
64.c.	"spring"	I said the word sipring.
64.d.	"spring"	I said the word spring.
65.a.	"screw"	I said the word screw.
65.b.	"iscrew"	I said the word iscrew.
65.c.	"iscrew"	I said the word screw.
65.d.	"screw"	I said the word iscrew.
66.a.	"sicrew"	I said the word screw.
66.b.	"screw"	I said the word sicrew.
66.c.	"sicrew"	I said the word sicrew.
66.d.	"screw"	I said the word screw.
67.a.	"istreet"	I said the word istreet.
67.b.	"street"	I said the word street.
67.c.	"istreet"	I said the word street.
67.d.	"street"	I said the word istreet.
68.a.	"street"	I said the word street.
68.b.	"stireet"	I said the word stireet.
68.c.	"stireet"	I said the word street.
68.d.	"street"	I said the word stireet.
69.a.	"isplit"	I said the word isplit.
69.b.	"split"	I said the word split.
69.c.	"isplit"	I said the word split.
69.d.	"split"	I said the word isplit.
70.a.	"split"	I said the word split.
70.b.	"spilit"	I said the word spilit.
70.c.	"spilit"	I said the word split.
70.d.	"split"	I said the word spilit.
71.a.	"sclerosis"	I said the word sclerosis.
71.b.	"isclerosis"	I said the word isclerosis.
71.c.	"sclerosis"	I said the word isclerosis.
71.d.	"isclerosis"	I said the word sclerosis.
72.a.	"siclerosis"	I said the word sclerosis.
72.b.	"sclerosis"	I said the word sclerosis.
72.c.	"sclerosis"	I said the word siclerosis.
72.d.	"siclerosis"	I said the word siclerosis.

73.a.	"isquare"	I said the word isquare.
73.b.	"square"	I said the word square.
73.c.	"isquare"	I said the word square.
73.d.	"square"	I said the word isquare

74.a.	"siquare"	I said the word square.
74.b.	"siquare"	I said the word siquare.
74.c.	"square"	I said the word square.
74.d.	"square"	I said the word siquare.

CC/affricate.

75.a.	"shrink."	I said the word shrink.
75.b.	"ishrink"	I said the word ishrink.
75.c.	"shrink"	I said the word ishrink.
75.d.	"ishrink"	I said the word shrink.

76.a.	"shirink"	I said the word shirink.
76.b.	"shrink"	I said the word shrink.
76.c.	"shrink"	I said the word shirink.
76.d.	"shirink"	I said the word shrink.

Final clusters. -CC/stops.

77.a.	"accept"	I said the word accept.
77.b.	"accepit"	I said the word accepit.
77.c.	"accepit"	I said the word accept.
77.d.	"accept"	I said the word accepit.

78.a.	"facit"	I said the word facit.
78.b.	"facit"	I said the word fact.
78.c.	"fact"	I said the word facit.
78.d.	"fact"	I said the word fact.

79.a.	"senit"	I said the word senit.
79.b.	"sent"	I said the word sent.
79.c.	"senit"	I said the word sent.
79.d.	"sent"	I said the word senit.

80.a.	"depth"	I said the word depth.
80.b.	"depith"	I said the word depth.
80.c.	"depith"	I said the word depith.
80.d.	"depth"	I said the word depith.

81.a.	"widith"	I said the word widith.
81.b.	"widith"	I said the word width.
81.c.	"width"	I said the word widith.
81.d.	"width"	I said the word width.
82.a.	"monith"	I said the word month.
82.b.	"month"	I said the word monith.
82.c.	"monith"	I said the word monith.
82.d.	"month"	I said the word month.
83.a.	"warmith"	I said the word warmith.
83.b.	"warmth"	I said the word warmith.
83.c.	"warmith"	I said the word warmth.
83.d.	"warmth"	I said the word warmth.
84.a.	"gapis"	I said the word gapis.
84.b.	"gaps"	I said the word gapis.
84.c.	"gapis"	I said the word gaps.
84.d.	"gaps"	I said the word gaps.
85.a.	"books"	I said the word books.
85.b.	"bookis"	I said the word bookis.
85.c.	"books"	I said the word bookis.
85.d.	"bookis"	I said the word books.
86.a.	"sinice"	I said the word sinice.
86.b.	"sinice"	I said the word since.
86.c.	"since"	I said the word sinice.
86.d.	"since"	I said the word since.
87.a.	"cats"	I said the word cats.
87.b.	"catis"	I said the word catis.
87.c.	"catis"	I said the word cats.
87.d.	"cats"	I said the word catis.
88.a.	"robbed"	I said the word robbied.
88.b.	"robbed"	I said the word robbed.
88.c.	"robbied"	I said the word robbed.
88.d.	"robbied"	I said the word robbied.
89.a.	"buggied"	I said the word buggied.
89.b.	"bugged"	I said the word bugged.
89.c.	"bugged"	I said the word buggied.
89.d.	"buggied"	I said the word bugged.
90.a.	"senid"	I said the word send.

90.b.	"send"	I said the word send.
90.c.	"senid"	I said the word senid.
90.d.	"send"	I said the word senid.
91.a.	"seemied"	I said the word seemied.
91.b.	"seemed"	I said the word seemed.
91.c.	"seemed"	I said the word seemied.
91.d.	"seemied"	I said the word seemed.
92.a.	"longed"	I said the word longed.
92.b.	"longied"	I said the word longied.
92.c.	"longed"	I said the word longied.
92.d.	"longied"	I said the word longed.
93.a.	"tabis"	I said the word tabis.
93.b.	"tabs"	I said the word tabs.
93.c.	"tabis"	I said the word tabs.
93.d.	"tabs"	I said the word tabis.
94.a.	"eggis"	I said the word eggis.
94.b.	"eggs"	I said the word eggis.
94.c.	"eggis"	I said the word eggs.
94.d.	"eggs"	I said the word eggs.
95.a.	"heads"	I said the word heads.
95.b.	"headis"	I said the word headis.
95.c.	"headis"	I said the word heads.
95.d	"heads"	I said the word headis.
96.a.	"henis"	I said the word henis.
96.b.	"henis"	I said the word hens.
96.c.	"hens"	I said the word henis.
96.d.	"hens"	I said the word hens.
97.a.	"comes"	I said the word comes.
97.b.	"comes"	I said the word comies.
97.c.	"comies"	I said the word comies.
97.d.	"comies"	I said the word comes.
98.a.	"ringis"	I said the word ringis.
98.b.	"ringis"	I said the word rings.
98.c.	"rings"	I said the word rings.
98.d.	"rings"	I said the word ringis.
99.a.	"bench"	I said the word bench.
99.b.	"bench"	I said the word benich.

99.c.	"benich"	I said the word bench.
99.d.	"benich"	I said the word benich.
100.a.	"ranige"	I said the word ranige.
100.b.	"ranige"	I said the word range.
100.c.	"range"	I said the word ranige.
100.d.	"range"	I said the word range.
101.a.	"nymph"	I said the word nymph.
101.b.	"nymiph"	I said the word nymph.
101.c.	"nymph"	I said the word nymiph.
101.d.	"nymiph"	I said the word nymiph.
102.a.	"jumip"	I said the word jumip.
102.b.	"jump"	I said the word jump.
102.c.	"jumip"	I said the word jump.
102.d.	"jump"	I said the word jumip.
103.a.	"sink"	I said the word sink.
103.b.	"sinik"	I said the word sinik.
103.c.	"sinik"	I said the word sink.
103.d.	"sink"	I said the word sinik.

Final clusters –CC affricate.

104.a.	"poachied"	I said the word poachied.
104.b.	"poached"	I said the word poached.
104.c.	"poachied"	I said the word poached.
104.d.	"poached"	I said the word poachied.
105.a.	"judged"	I said the word judged.
105.b.	"judgied"	I said the word judgied.
105.c.	"judged"	I said the word judgied.
105.d.	"judgied"	I said the word judged.

Final clusters/ -CC liquids

106.a.	"helip"	I said the word helip.
106.b.	"help"	I said the word help.
106.c.	"help"	I said the word helip.
106.d.	"helip"	I said the word help.
107.a.	"bulb"	I said the word bulb.
107.b.	"bulib"	I said the word bulib.
107.c.	"bulb"	I said the word bulib.

107.d.	"bulib"	I said the word bulb.
108.a.	"quilt"	I said the word quilit.
108.b.	"quilit"	I said the word quilt.
108.c.	"quilit"	I said the word quilit.
108.d.	"quilt"	I said the word quilt.
109.a.	"colid"	I said the word colid.
109.b.	"colid"	I said the word cold.
109.c.	"cold"	I said the word colid.
109.d.	"cold"	I said the word cold.
110.a.	"milik"	I said the word milk.
110.b.	"milik"	I said the word milik.
110.c.	"milk"	I said the word milk.
110.d.	"milk"	I said the word milik.
111.a.	"filich"	I said the word filich.
111.b.	"filich"	I said the word filch.
111.c.	"filch"	I said the word filich.
111.d.	"filch"	I said the word filch.
112.a.	"bulge"	I said the word bulige.
112.b.	"bulige"	I said the word bulge.
112.c.	"bulge"	I said the word bulge.
112.d.	"bulige"	I said the word bulge.
113.a.	"filim"	I said the word filim.
113.b.	"filim"	I said the word film.
113.c.	"film"	I said the word film.
113.d.	"film"	I said the word filim.
114.a.	"wolf"	I said the word wolf.
114.b.	"wolif"	I said the word wolif.
114.c.	"wolif"	I said the word wolf.
114.d.	"wolf"	I said the word wolif.
115.a.	"twelive"	I said the word twelive.
115.b.	"twelive"	I said the word twelve.
115.c.	"twelve"	I said the word twelive.
115.d.	"twelve"	I said the word twelve.
116.a.	"health"	I said the word health.
116.b.	"health"	I said the word healith.
116.c.	"healith"	I said the word health.
116.d.	"healith"	I said the word healith.

117.a.	"elise"	I said the word elise.
117.b.	"elise"	I said the word else.
117.c.	"else"	I said the word elise.
117.d.	"else"	I said the word else.
118.a.	"fillis"	I said the word fillis.
118.b.	"fills"	I said the word fills.
118.c.	"fills"	I said the word fillis.
118.d.	"fillis"	I said the word fills.
119.a.	"Welsh"	I said the word Welsh.
119.b.	"Welish"	I said the word Welish.
119.c.	"Welsh"	I said the word Welish.
119.d.	"Welish"	I said the word Welsh.
120.a.	"harip"	I said the word harip.
120.b	"harp"	I said the word harp.
120.c.	"harp"	I said the word harip.
120.d.	"harip"	I said the word harp.
121.a.	"turn"	I said the word turn.
121.b.	"turin"	I said the word turn.
121.c.	"turn"	I said the word turin.
121.d.	"turin"	I said the word turin.
122.a.	"girl"	I said the word giril.
122.b.	"giril"	I said the word giril.
122.c.	"giril"	I said the word girl.
122.d.	"girl"	I said the word girl.
123.a.	"berg"	I said the word berg.
123.b.	"berig"	I said the word berg.
123.c.	"berg"	I said the word berig.
123.d.	"berig"	I said the word berig.
124.a.	"scarf"	I said the word scarf.
124.b.	"scarf"	I said the word scarif.
124.c.	"scarif"	I said the word scarf.
124.d.	"scarif"	I said the word scarif.
125.a.	"large"	I said the word larige.
125.b.	"larige"	I said the word large.
125.c.	"larige"	I said the word larige.
125.d.	"large"	I said the word large.

126.a. "Marich" I said the word Marich.
126.b. "Marich" I said the word March.
126.c. "March" I said the word Marich.
126.d. "March" I said the word March.

127.a. "serive" I said the word serve.
127.b. "serve" I said the word serive.
127.c. "serive" I said the word serive.
127.d. "serve" I said the word serve.

128.a. "word" I said the word 'word'.
128.b. "worid" I said the word 'word'.
128.c. "worid" I said the word 'worid'.
128.d. "word" I said the word 'worid'.

129.a. "carit" I said the word carit.
129.b. "carit" I said the word cart.
129.c. "cart" I said the word carit.
129.d. "cart" I said the word cart.

Final clusters /-CC fricative.

130.a. "gift" I said the word gift.
130.b. "gift" I said the word gifit.
130.c. "gifit" I said the word gifit.
130.d. "gifit" I said the word gift.

131.a. "earthed" I said the word earthied.
131.b. "earthied" I said the word earthied.
131.c. "earthied" I said the word earthed.
131.d. "earthed" I said the word earthed.

132.a. "nesit" I said the word nesit.
132.b. "nesit" I said the word nest.
132.c. "nest" I said the word nesit.
132.d. "nest" I said the word nest.

134.a. "rushed" I said the word rushed.
134.b. "rushied" I said the word rushied.
134.c. "rushied" I said the word rushed.
134.d. "rushed" I said the word rushied.

135.a. "laughis" I said the word laughis.
135.b. "laughis" I said the word laughs.
135.c. "laughs" I said the word laughs.
135.d. "laughs" I said the word laughis.

136.a.	"eighths"	I said the word eighths.
136.b.	"eighthis"	I said the word eighthis.
136.c.	"eighthis"	I said the word eighths.
136.d.	"eighths"	I said the word eighthis.
137.a.	"loved"	I said the word loved.
137.b.	"loved"	I said the word lovied.
137.c.	"lovied"	I said the word loved.
137.d.	"lovied"	I said the word lovied.
138.a.	"raised"	I said the word raisied.
138.b.	"raisied"	I said the word raisied.
138.c.	"raisied"	I said the word raised.
138.d.	"raised"	I said the word raised.
139.a.	"arrangied"	I said the word arrangied.
139.b.	"arranged"	I said the word arranged.
139.c.	"arrangied"	I said the word arranged.
139.d.	"arranged"	I said the word arrangied.
140.a.	"loves"	I said the word loves.
140.b.	"lovies"	I said the word lovies.
140.c.	"lovies"	I said the word loves.
140.d.	"loves"	I said the word lovies.
141.a.	"fifith"	I said the word fifth.
141.b.	"fifth"	I said the word fifith.
141.c.	"fifth"	I said the word fifth.
141.d.	"fifith"	I said the word fifith.
142.a.	"widith"	I said the word widith.
142.b.	"width"	I said the word width.
142.c.	"width"	I said the word widith.
142.d.	"widith"	I said the word width.
143.a.	"wasp"	I said the word wasp.
143.b.	"wasip"	I said the word wasip.
143.c.	"wasip"	I said the word wasp.
143.d.	"wasp"	I said the word wasip.
144.a.	"asik"	I said the word asik.
144.b.	"ask"	I said the word ask.
144.c.	"asik"	I said the word ask.
144.d.	"ask"	I said the word asik.

Final clusters –CC stops.

145.a.	"hinge"	I said the word hinge.
145.b.	"hinge"	I said the word hinige.
145.c.	"hinige"	I said the word hinige.
145.d.	"hinige"	I said the word hinge.
146.a.	"length"	I said the word length.
146.b.	"length"	I said the word lengith.
146.c.	"lengith"	I said the word lengith.
146.d.	"lengith"	I said the word length.
147.a.	"campied".	I said the word campied.
147.b.	"camped"	I said the word camped.
147.c.	"campied"	I said the word campied.
147.d.	"campied"	I said the word camped.
148.a.	"acts".	I said the word acts.
148.b.	"actis"	I said the word acts.
148.c.	"actis"	I said the word actis.
148.d.	"acts"	I said the word actis.
149.a.	"paints"	I said the word paints.
149.b.	"paints"	I said the word paintis.
149.c.	"paintis"	I said the word paintis.
149.d.	"paintis"	I said the word paints.
150.a.	"nymphis"	I said the word nymphis.
150.b.	"nymphs"	I said the word nymphs.
150.c.	"nymphs"	I said the word nymphis.
150.d.	"nymphis"	I said the word nymphs.
151.a.	"pumps"	I said the word pumps.
151.b.	"pumpis"	I said the word pumpis.
151.c.	"pumps"	I said the word pumpis.
151.d.	"pumpis"	I said the word pumps.
152.a.	"crypts"	I said the word cryptis.
152.b.	"crypts"	I said the word crypts.
152.c.	"cryptis"	I said the word cryptis.
152.d.	"cryptis"	I said the word crypts.
153.a.	"nexit"	I said the word nexit.
153.b.	"nexit"	I said the word next.
153.c.	"next"	I said the word nexit.
153.d.	"next"	I said the word next.

154.a.	"sensed"	I said the word sensed.
154.b.	"sensied"	I said the word sensied.
154.c.	"sensied"	I said the word sensed.
154.d.	"sensed"	I said the word sensied.
155.a.	"midist"	I said the word midist.
155.b.	"midst".	I said the word midst.
155.c.	"midst"	I said the word midist.
155.d.	"midist"	I said the word midst.
156.a.	"angst"	I said the word angst.
156.b.	"angist"	I said the word angist.
156.c.	"angst"	I said the word angist.
156.d.	"angist"	I said the word angst.
157.a.	"lumpied"	I said the word lumpied.
157.b.	"lumped"	I said the word lumped.
157.c.	"lumpied"	I said the word lumped.
157.d.	"lumped"	I said the word lumpied.
158.a.	"links"	I said the word liniks.
158.b.	"liniks"	I said the word links.
158.c.	"liniks"	I said the word liniks.
158.d.	"links"	I said the word liniks.
159.a.	"depiths"	I said the word depiths.
159.b.	"depths"	I said the word depths.
159.c.	"depiths"	I said the word depths.
159.d.	"depths"	I said the word depiths.
160.a.	"months"	I said the word months.
160.b.	"months"	I said the word moniths.
160.c.	"moniths"	I said the word moniths.
160.d.	"moniths"	I said the word months.
161.a.	"eighths"	I said the word eighths.
161.b.	"eighthis"	I said the word eighthis.
161.c.	"eighths"	I said the word eighthis.
161.d.	"eighthis"	I said the word eighths.
162.a.	"pinchied"	I said the word pinchied.
162.b.	"pinched"	I said the word pinchied.
162.c.	"pinchied"	I said the word pinched.
162.d.	"pinched"	I said the word pinched.

163.a. "lounged" I said the word lounged.
163.b. "loungied" I said the word loungied.
163.c. "lounged" I said the word loungied.
163.d. "loungied" I said the word lounged.

164.a. "bronzed" I said the word bronzed.
164.b. "bronzied" I said the word bronzed.
164.c. "bronzed" I said the word bronzied.
164.d. "bronzied" I said the word bronzied.

Final clusters –CCC liquids

165.a. "miliks" I said the word miliks.
165.b. "milks" I said the word milks.
165.c. "milks" I said the word miliks.
165.d. "miliks" I said the word milks.

166.a. "resulits" I said the word results.
166.b. "results" I said the word resulits.
166.c. "resulits" I said the word resulits.
166.d. "results" I said the word results.

167.a. "elifs" I said the word elifs.
167.b. "elfs" I said the word elfs.
167.c. "elfs" I said the word elifs.
167.d. "elifs" I said the word elfs.

168.a. "tiliths" I said the word tilths.
168.b. "tilths" I said the word tiliths.
168.c. "tiliths" I said the word tiliths.
168.d. "tilths" I said the word tilths.

169.a. "miliked" I said the word miliked.
169.b. "milked" I said the word miliked.
169.c. "miliked" I said the word milked.
169.d. "milked" I said the word milked.

170.a. "bulibs" I said the word bulbs.
170.b. "bulibs" I said the word bulibs.
170.c. "bulbs" I said the word bulibs.
170.d. "bulbs" I said the word bulbs.

171.a.	"holids"	I said the word holids.
171.b.	"holds"	I said the word holids.
171.c.	"holids"	I said the word holds.
171.d.	"holds"	I said the word holds.
172.a.	"elims"	I said the word elms.
172.b.	"elms"	I said the word elims.
172.c.	"elims"	I said the word elims.
172.c.	"elms"	I said the word elms.
173.a.	"kilins"	I said the word kilns.
173.b.	"kilns"	I said the word kilins.
173.c.	"kilns"	I said the word kilns.
173.d.	"kilins"	I said the word kilins.
174.a.	"elives"	I said the word elives.
174.b.	"elves"	I said the word elves.
174.c.	"elves"	I said the word elives.
174.d	"elives"	I said the word elves.
175.a.	"belched"	I said the word belched.
175.b.	"beliched"	I said the word belched.
175.c.	"belched"	I said the word beliched.
175.d.	"beliched"	I said the word beliched.
176.a.	"induliged"	I said the word induliged.
176.b.	"indulged"	I said the word indulged.
176.c.	"indulged"	I said the word induliged.
176.d.	"induliged"	I said the word indulged.
177.a.	"twelfth"	I said the word twelifth.
177.b.	"twelfth"	I said the word twelfth.
177.c.	"twelifth"	I said the word twelfth.
177.d.	"twelifth"	I said the word twelifth.
178.a.	"delived"	I said the word delived.
178.b.	"delved"	I said the word delived.
178.c.	"delived"	I said the word delved.
178.d.	"delved"	I said the word delved.

Final clusters –CCC /fricative.

179.a.	"rafits"	I said the word rafts.
179.b.	"rafts"	I said the word rafits.
179.c.	"rafts"	I said the word rafts.
179.d.	"rafits"	I said the word rafits.

180.a.	"resits"	I said the word resits.
180.b.	"rests"	I said the word rests.
180.c.	"rests"	I said the word reists.
180.d.	"resits"	I said the word rests.
181.a.	"fifiths"	I said the word fifiths.
181.b.	"fifths"	I said the word fifiths.
181.c.	"fifiths"	I said the word fifths.
181.d.	"fifths"	I said the word fifths.
182.a.	"maskied"	I said the word maskied.
182.b.	"masked"	I said the word masked.
182.c.	"masked"	I said the word maskied.
182.d.	"maskied"	I said the word masked.
183.a..	"asiks"	I said the word asks.
183.b.	"asks"	I said the word asiks.
183.c.	"asks"	I said the word asks.
183.d.	"asiks"	I said the word asiks.
184.a.	"wasps"	I said the word wasps.
184.b.	"wasips"	I said the word wasps.
184.c.	"wasps"	I said the word wasips.
184.d.	"wasips"	I said the word wasips.
185.a.	"gasiped"	I said the word gasiped.
185.b.	"gasped"	I said the word gasiped.
185.c.	"gasiped"	I said the word gasped.
185.d.	"gasped"	I said the word gasped.

Appendix D

Battery (4) A.

Metrical stress.(perception/grammatical forms.)

1. aroma.
2. arena.
3. horizon.
4. trachoma
5. agenda.
6. appendix.
7. veranda.
8. synopsis.
9. cinema.
10. America.
11. cabinet.
12. venison.
13. maintain.
14. appear.
15. achieve.
16. decide.
17. collapse.
18. observe.
19. adapt.
20. elect.
21. edit.
22. consider.
23. interpret.
24. cancel.
25. hurricane.
26. antelope.
27. candidate.
28. matador.

Appendix E

Battery (4) B.

Ungrammatical forms:

1.a. The thing I like about coffee is the ARoma.
1.b. The thing I like about coffee is the aROma.
1.c. The thing I like about coffee is the aroMA.

2.a. The town asked for a big loan to build an aREna.
2.b. The town asked for a big loan to build an ARena.
2.c. The town asked for a big loan to build an areNA.

3.a. You can see the sun a bit above the hoRIzon.
3.b. You can see the sun a bit above the HOrizon.
3.c. You can see the sun a bit above the horiZON.

4.a. He suffered a severe traCHOma.
4.b. He suffered a severe TRAchoma.
4.c. He suffered a severe trachoMA.

5.a. We can't talk about that, it is not on the AGenda.
5.b. We can't talk about that, it is not on the agENda.
5.c. We can't talk about that, it is not on the agenDA.

6.a. I am thirty years old and I still have my APpendix.
6.b. I am thirty years old and I still have my apPENdix.
6.c. I am thirty years old and I still have my appenDIX.

7.a. When it gets hot I like to sit on the veranDA.
7.b. When it gets hot I like to sit on the veRANda.
7.c. When it gets hot I like to sit on the VEranda.

8.a. He didn't read the book, he just read a SYNopsis.
8.b. He didn't read the book, he just read a synOPsis.
8.c. He didn't read the book, he just read a synopSIS.

9.a. On Saturdays I like to go to the CInema.
9.b. On Saturdays I like to go to the ciNEma.
9.c. On Saturdays I like to go to the cineMA.

10.a. She used to live in AMerica.
10.b. She used to live in AmERica.
10.c. She used to live in AmerICA.

11.a. I was trying to fix the doors in the CAbinet.
11.b. I was trying to fix the doors in the caBEnet.
11.c. I was trying to fix the doors in the cabiNET.

12.a. It has a strong taste but I really like VEnison.
12.b. It has a strong taste but I really like veNIson.
12.c. It has a strong taste but I really like veniSON.

13.a. I find that position much too tiring to mAINtain.
13.b. I find that position much too tiring to maintAIN.
13.c. I find that position much too tiring to MAIntain.

14.a. I don't think she 's as old as she might APPear.
14.b. I don't think she 's as old as she might apPEAr.
14.c. I don't think she 's as old as she might appear.

15.a. I was amazed by what you were able to ACHieve.
15.b. I was amazed by what you were able to achIEVe.
15.c. I was amazed by what you were able to achieve.

16.a. I need time to DEcide.
16.b. I need time to deCIde.
16.c. I need time to decide.

17.a. I really didn't think that the building would COllapse.
17.b. I really didn't think that the building would colLApse.
17.c. I really didn't think that the building would collapse.

18.a. You can't take part in the class but you are allowed to OBserve.
18.b. You can't take part in the class but you are allowed to obSErve.
18.c. You can't take part in the class but you are allowed to observe.

19.a. When I came to England; it was hard to ADapt.
19.b. When I came to England; it was hard to adAPt.
19.c. When I came to England; it was hard to adapt.

20.a. People were still not sure whom they should ELect.
20.b. People were still not sure whom they should elECt.
20.c. People were still not sure whom they should elect.

21.a. This new manuscript is quite difficult to EDit.
21.b. This new manuscript is quite difficult to edIT.
21.c. This new manuscript is quite difficult to edit.

22.a. They made Tony an offer he's going to COnsider.
22.b. They made Tony an offer he's going to consider.

22.c. They made Tony an offer he's going to conSIder.

23.a. Some of the results were difficult to INterpret.
23.b. Some of the results were difficult to inTErpret.
23.c. Some of the results were difficult to interpREt.

24.a. I can't come in that day, I think I will have to CAncel.
24.b. I can't come in that day, I think I will have to canCEl.
24.c. I can't come in that day, I think I will have to cancel.

25.a. Edinburgh was devastated by a hURricane.
25.b. Edinburgh was devastated by a hurRIcane.
25.c. Edinburgh was devastated by a hurriCAne.

26.a. When we all went to the zoo we saw an ANtelope.
26.b. When we all went to the zoo we saw an anTElope.
26.c. When we all went to the zoo we saw an anteLOpe.

27.a. They asked me but I don't want to be the CAndidate.
27.b. They asked me but I don't want to be the canDIdate.
27.c. They asked me but I don't want to be the candiDAte.

28.a. My brother always wanted to be a MAtador.
28.b. My brother always wanted to be a maTAdor.
28.c. My brother always wanted to be a mataDOr.

Appendix F

Battery (5)A:

Read the following words:

- **Spiccato**
- **Psychosis**
- **Trachoma.**
- **Tectonics**
- **Synopsis**
- **Incentive**
- **Parapet**
- **Advocate**
- **Calibre.**

Appendix G

Battery (5) C:

Read the following sentences:

1- The thing I like about the coffee is the aroma.

2- The town asked for a big loan to build an arena.

3- You can see the sun a bit above the horizon.

4- He suffered a severe trachoma.

5- We can't talk about that, it is not in the agenda.

6- I am thirty years old and I still have my appendix.

7- When it gets hot I like to sit on the veranda.

8- He didn't read the book, he just read a synopsis.

9- On Saturdays I like to go to the cinema.

10- She used to live in America.

11- I was trying to fix the doors in the cabinet.

12- It has a strong taste but I really like venison.

13- I find that position much too tiring to maintain.

14- I don`t think she‘s as old as she might appear.

15- I was amazed by what you were able to achieve.

16- I need time to decide.

17- I really didn’t think that the building would collapse.

18- You can’t take part in the class but you are allowed to observe.

19- When I came to England; it was hard to adapt.

20- People were still not sure whom they should elect.

21- This new manuscript is quite difficult to edit.

22- They made Tony an offer he’s going to consider.

23- Some of the results were difficult to interpret.

24- I can’t come in that day, I think I will have to cancel.

25- Edinburgh was devastated by a hurricane.

26- When we all went to the zoo we saw an antelope.

27- They asked me but I don’t want to be the candidate.

28- My brother wanted to be a matador.

Appendix H [Four pictures].
Appendix I [result sheet].
Appendix J [questionnaire]